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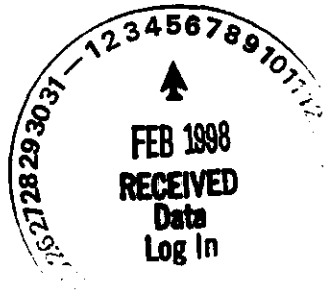
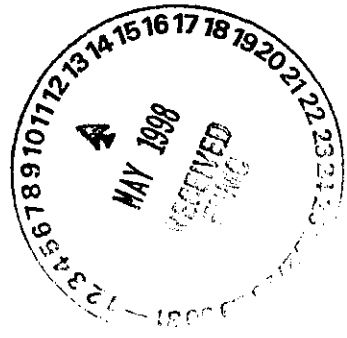
ANALYTICAL SERVICES



FINAL REPORT FOR 105-N BASIN SEDIMENT DISPOSITION TASK PHASE II SAMPLES BOMPC8 AND BOMPC9



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222-S ANALYTICAL SERVICES

FINAL REPORT FOR 105-N BASIN SEDIMENT DISPOSITION TASK PHASE II SAMPLES BOMPC8 AND BOMPC9

This document is the final report deliverable for Phase II analytical work for the 105-N Basin Sediment Disposition Task. On December 23, 1997, ten samples were received at the 222-S Laboratory as follows: two (2) bottles of potable water, six (6) samples for process control testing and two (2) samples for characterization (BOMPC8 and BOMPC9). Analyses were performed in accordance with the *Letter of Instruction for Phase II Analytical Work for the 105-N Basin Sediment Disposition Task* (LOI) (Logan and Kessner, 1997) (Attachment 7) and *105-N Basin Sediment Disposition Phase-Two Sampling and Analysis Plan* (SAP) (Smith, 1997). The analytical results are included in Table 1.

Appearance and Sample Handling

Attachment 1 is provided as a cross-reference for relating the customer identification numbers for the two samples identified for characterization with the 222-S Laboratory sample numbers and the portion of sample analyzed. The copies of the change of custody forms are provided in Attachment 8.

Upon receipt, the sample bottles were removed from the shipping containers and video pictures were taken. Table 2 provides a brief description of the appearance of each sample within two hours of receipt. The two potable water samples received, which are intended for shipment to Chem Nuclear Systems, Inc., are not included in this table.

Since the samples contained a significant amount of flocculent material and were shaken to some extent during shipping, the volumes indicated in the table are only rough approximations of the settled solids and standing liquids. After further settling the volumes of solids were lower but not recorded. Pictures of the individual samples as received and of the composite of BOMPC8 and BOMPC9 are provided in Attachment 2.

Table 2. Sample Description

Customer Sample ID	Laboratory Sample Number	Description
BOMPC8	S97N000072	~550 mL of sludge and ~350 mL of mostly clear brown liquid
BOMPC9	S97N000081	~250 mL of sludge and ~750 mL of mostly clear brown liquid

Table 2. Sample Description

Customer Sample ID	Laboratory Sample Number	Description
BOMPD0	S97N000082	~300 mL of sludge and ~600 mL of mostly clear brown liquid
BOMPD1	S97N000083	~400 mL of sludge and ~500 mL of mostly clear brown liquid
BOMPD3	S97N000084	~450 mL of sludge and ~450 mL of mostly clear brown liquid
BOMPD4	S97N000085	No appearance available - bottle was upside-down in the shipping container
BOMPD5	S97N000086	~400 mL of sludge and ~500 mL of mostly clear brown liquid
BOMPD6	S97N000087	~400 mL of sludge and ~500 mL of mostly clear brown liquid

Upon closer inspection of samples BOMPC8 and BOMPC9, the following appearance was observed:

> Sample BOMPC8 contained about 250 mL of sand-like settled solids with approximately 300 mL of flocculent solids. The remaining 350 mL of sample was mostly clear red-brown liquid.
>
> Sample BOMPC9 contained about 200 mL of sand-like settled solids, approximately 50 mL of flocculent solids and approximately 750 mL of mostly clear red-brown liquid on top.

The two samples were shaken, combined and allowed to settle. After fourteen hours, approximately 1/3 of the settled solids in the composite sample were still very flocculent. The standing water was removed from above this layer, the remaining material was stirred and subsampled for characterization analysis. Since it was likely that the solids may continue to settle over time, each subsample was stirred before each direct analysis. This stirring ensured that the analyzed portion would be representative of the solid/liquid ratio as it was after the original 14 hours of settling.

The percent settled solids by mass was calculated as 56.4%. This represents the percent, by mass, of solids, both sand-like and flocculent, that had settled in the composite bottle within 14 hours of mixing. There was a significant portion of interstitial liquid that was not removed, due to the presence of the solids after the requested 12 hours of settling, that is represented in this percent settled solids by mass result.

Analytical Results Summary

The data summary report (Table 1) included in this report presents the analytical results.

In this table, the aliquot class (A#) column indicates the type of preparation performed prior to analysis. A "C" indicates that an acid digestion was performed either on the solid or on the liquid from the Toxicity Characteristics Leachate Procedure (TCLP) extraction, a blank indicates that the solid sample or the TCLP extract was analyzed directly, without a separate preparation step. The direct analysis applies primarily to the mercury (Hg) analysis, which has a preparation as part of the procedure, and physical tests, such as density and pH measurements.

The SAP (Smith, 1997) requested that all non-radionuclide analyses, with the exceptions of pH and physical measurements, be analyzed using SW-846 methods. The procedures used for the analyses are considered SW-846 equivalent. Deviations are made to accommodate smaller sample sizes for handling samples with radioactive components.

Sample Preparations

Toxicity Characteristics Leachate Procedure (TCLP) Digestion

Test portions of the standard and sample indicated that extraction fluid #1 was required for the TCLP digest. Extraction fluid #1 was prepared as follows: 5.7 mL glacial acetic acid was diluted to 500 mL with reagent water, 64.3 mL of 1N NaOH (sodium hydroxide) was added; the resulting mixture was diluted to 1 liter; solution pH = 4.93 +/- 0.05.

Approximately 10 grams of standard and sample were extracted for analysis.

Mercury analysis was performed on the direct TCLP extract. For ICP analysis, an additional acid digestion (EPA Contract Laboratory (CLP) equivalent procedure) was performed on the TCLP extract prior to analysis.

Acid Digestion

For sludge characterization, an acid digestion was performed on the wet settled solids. Following the acid digestion, the percent undissolved solids was determined. The results, based on the dry weight of the sample, were: 49.77% for the sample portion, 53.59% for the duplicate and 59.17% for the spiked sample portion.

Inorganic Analyses

Physical Measurements (Density, Particle size, Percent water and Percent solids)

A portion of the wet settled solids was used to determine the settled solid density. This same portion was then centrifuged to determine the centrifuged solid density. The results of these determinations are discussed in Attachment 3.

A separate portion of the wet settled solids was used to determine the particle size using both the particle distribution analyzer and by the sieve test. These results are also presented in Attachment 3.

A third portion of wet settled solids was used for the gravimetric determination of percent water and percent solids. In this analysis, the percent water (%water) was determined based on percent weight loss after drying a portion of the sample in an oven. The percent solids was then calculated as 100% - %water. The results of this analysis are presented in Table 1. The standard recoveries and relative percent difference (RPD) between sample and duplicate determinations were within the requested limits.

pH of the Wet Sludge

The pH was determined as a direct analysis on the wet settled solids. The standard was acceptable and the RPD met the requirements stated in the SAP (Smith, 1997).

Inductively Coupled Plasma Spectrophotometry (ICP)

Inductively coupled plasma (ICP) analysis was requested for TCLP metals as well as for sludge characterization. For the TCLP determination, the ICP analysis was performed on an acid digested portion of the extractant from the TCLP leaching of the wet settled solids. For the sludge characterization, the ICP analysis was performed on an acid digested portion of the wet settled solids.

TCLP Analysis

The TCLP ICP analyte list includes: silver (Ag), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb) and selenium (Se). For this project, the following analytes were added to the analysis: beryllium (Be), nickel (Ni), antimony (Sb), thallium (Tl) and vanadium (V). Table 1 presents sample and duplicate results for all of the requested analytes listed above. However, since TCLP analysis was requested, standard recovery and spike recovery information is only applicable for the TCLP analyte list. The standard and spike recoveries for all other analytes are reported as "n/a" in the table.

The standard recoveries presented in Table 1 for the TCLP analysis (sample number S97N000075) are those for the solid TCLP standard that was carried through the TCLP extraction followed by the acid digestion. In the interim report, it was reported that the standard recoveries and spike recoveries for the TCLP metals were approximately 70%. This statement was based on a preliminary observation. The results presented in Table 1 are the correct standard and spike recoveries.

The standard recoveries range from 47.57% to 120.8% recovery. The results for the standard were compared with the information provided by the vendor which is included in the raw data for the acid digest of the extract. This information provided reference values, Confidence Intervals (C.I.) (95% C.I. for the reference value) and Prediction Intervals (P.I.) (95% P.I. around the reference value; $\approx \pm 2\sigma$) for the TCLP metals in soil. The Ag, Cd and Se standard results were within the C.I. All others were outside of the C.I. but inside the P.I., except for Cr (47.57%) which was outside of both acceptance ranges. The P.I. range for Cr was 76.6% - 123.4% recovery. The information sheet indicated that, "Measurements should fall within the P.I. range 19 of 20 times." The cause for the low recovery is unknown, it is possibly due to a poor TCLP extraction. The recoveries for the additional digested standard and the matrix spike for Cr were acceptable. Due to time constraints no additional preparation or reanalysis was requested.

All of the spike recoveries were within the requested range of 70% - 130% recovery, except for Ag (59.40%). A post digestion spike was analyzed with 83.2% recovery. This suggests that there was a problem with the TCLP extraction or subsequent acid digestion. NaOH in the extraction fluid or possibly high chloride in the sample material may cause precipitation of silver during the extraction or subsequent acid digestion. No further reanalyses were requested.

All of the RPDs were within the requested range of $\leq$30%. None of the requested analytes were detected in the preparation blank. The reported detection limits for Be, Se and Tl did not meet the requested practical quantitation limits (PQL) because of the reduced sample size required for handling the radioactive sample.

Sludge Characterization Analysis

For the sludge characterization, the results for the full suite of ICP metals are presented in Table 1. However, the quality control (QC) discussion below pertains only to the analytes requested in the LOI (Logan and Kessner, 1997).

The standard recoveries for all analytes met the requirements stated in the SAP (Smith, 1997). Two analytes had RPDs greater than the requested 30%; Na (54.7%) and Pb (36.2%). These high RPDs were attributed to the heterogeneity of the sample matrix (sand mixed with flocculent sludge). No reruns were requested.

Matrix spike recoveries for Al, Fe, Si and Zn were outside of the control limits stated in the SAP (Smith, 1997) (70% to 130% recovery). This was attributed to the high concentration of these analytes in the samples with respect to the amount of spike standard added. In addition, sample inhomogeneity may be a contributing factor for the matrix spike failure.

A post digestion spike analysis was performed for each analyte that failed the matrix spike analysis as an instrument performance check. The post digestion spike recoveries were all within the requested control limits. These recoveries are presented in the raw data.

In addition to the matrix spike and post digestion spike analyses, a serial dilution analysis was performed by diluting the sample an additional five-fold. The serial dilution provides information about the accuracy of the analysis when the sample concentration is more than four times the concentration of the matrix spike standard added. For acceptable performance the percent difference between the serial dilution and the undiluted results must be ≤ 10 percent. Table 3 shows a comparison of the result of the sample with that of the serial dilution for those required analytes that had a matrix spike recovery outside of the requested limits. The results presented in this table have not been corrected for the acid digestion factor, and are therefore reported as μg/mL. The serial dilution results may be found in the raw data and are identified by an "_L" at the end of the sample number. The results provided in Table 3 indicate that the accuracy of the analysis was acceptable.

Table 3: ICP Serial Dilution Results for 105-N Basin Phase 2

Sample ID	Analyte	Undiluted Sample Result (µg/mL)*	Serial Dilution Result (µg/mL)*	Percent Difference (%)
S97N000077				
	Al	4.48e+01	4.55e+01	1.6
	Fe	4.63e+02	4.59e+02	0.8
	Si	5.83e+00	5.96e+00	2.3
	Zn	4.89e+00	4.84e+00	1.1

Percent Difference = [ABS(Sample - Serial Dilution))/Sample] X 100

* - Results in this table do not account for the acid digest dilution

The preparation blank showed results above the detection level for Fe, Na, Si and Zn. Some of these analytes (e.g. silicon and sodium) are common contaminants in acid digested samples due to leaching or contamination from the glassware. However, in all cases, the level of contamination was less than the reported detection limit for the sample and, therefore, does not affect the useability of these results.

The requested PQLs were not met for most analytes because of the dilution required due to the high concentration of Fe and the radioactivity of the sample. The alternate graphite furnace atomic absorption (GFAA) method was not used to achieve lower detection limits because the methodology was not available.

Mercury Analysis (Hg)

Mercury (Hg) analysis was requested for TCLP analysis as well as for sludge characterization. For the TCLP determination, the Hg analysis was performed on the extractant from the TCLP leaching of the wet settled solids. For the sludge characterization, the Hg analysis was performed on a portion of the wet settled solids.

TCLP Analysis

No Hg was detected in the TCLP extract. The results were reported as less than the detection limit, which met the PQL requested in the LOI (Logan and Kessner, 1997). The RPD calculation was not applicable. The recovery for Hg in the soil standard for TCLP metals was low, 47.80% recovery. The result was outside of the P.I. range (60.9% - 139.8% recovery). As with Cr, the cause for the low recovery was unknown, it is possibly due to a poor TCLP extraction. The instrument standard and matrix spike recoveries for the Hg were acceptable. Again, due to time constraints no additional analyses were requested.

Sludge Characterization Analysis

For the sludge characterization, the Hg analysis was performed directly on the wet settled solids. The standard recovery and the RPD met the acceptance criteria stated in the SAP (Smith, 1997). The detection limit met the PQL requirement.

The spike recovery for this determination was low (66.60% recovery). This failure was probably due to the inhomogeneity of the sample matrix. The instrumentation used for this direct analysis typically requires a very small sample size. Due to the nature of the wet settled solids, the technician was only able to obtain a much larger aliquot. However, during the preparation, there was no indication that the digestion was insufficient. The analysis was performed twice, with a spike failure each time. Since all other QC was acceptable on the second analysis, no further reanalysis was performed. Both sets of data will be provided. However, only the second run is presented in Table 1.

Isotopic Uranium by ICP/Mass Spectrometry (ICP/MS)

Isotopic uranium was determined by inductively coupled plasma/mass spectrometry (ICP/MS). The analysis was performed on an acid digested portion of the wet settled solids. The reported isotopes were: ^{233}U, ^{234}U, ^{235}U, ^{236}U and ^{238}U. The standard and spike recoveries for the ^{238}U met the requested criteria. The RPDs for all isotopes were acceptable. The requested PQLs were met for all analytes.

The LOI (Logan and Kessner, 1997) indicated PQLs in μCi/g. However, the normal reporting units are μg/g for isotopes determined by ICP/MS. Conversion to μCi/g units may be provided upon request.

Radionuclide Analyses

Total Alpha/Total Beta Activity (AT/TB)

The total alpha and total beta activity (AT/TB) were determined from the acid digested wet settled sludge sample. The standard recoveries, spike recoveries and RPDs for these analyses were all within the requested limits. The PQL requirements were also met. A low level of beta activity was detected in the preparation blank. However, the level of contamination was below the reported detection limit and was insignificant with respect to the sample results. Therefore, the contamination does not affect the useability of these results.

Gamma Energy Analysis (GEA)

GEA analysis was requested for ^{60}Co, ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{226}Ac and ^{241}Am. The analysis was performed on the acid digested wet settled solid. The standard recoveries (^{60}Co, ^{137}Cs, ^{228}Ac and ^{241}Am) and RPDs met the requirements stated in the SAP (Smith, 1997). The PQL requirements were met for all isotopes except ^{225}Ra. No reanalysis was performed because the higher detection limit was based on the dilution required due to the concentration of ^{137}Cs in the sample.

The isotope list that is normally reported for the GEA analysis does not include ^{125}Sb and the results for this analyte are not presented in Table 1, but is included in the extraneous peak report included with the worklist. Based on the background readings and the acid digest dilution, the result was: $< 1.794e\text{-}02$ μCi/g. This result met the requested PQL.

A low level of ^{137}Cs was detected in the preparation blank. However, the level of contamination was below the reported detection limit and was insignificant with respect to the sample results. Therefore, the contamination does not affect the useability of these results.

For GEA analytes that have a detectable amount of activity, the software does not report instrument detection limits due to potential interferences from other gamma emitting nuclides. In this case, the DL is reported as "n/a". When no detectable activity is observed for an analyte, the DL is reported as the minimum detectable activity (MDA) for that analyte based on the region of interest from the GEA spectrum of that sample aliquot. These values are effected by high activity of other gamma emitting nuclides in the sample.

Strontium-90 (^{90}Sr)

The ^{90}Sr analysis was performed on the acid digested wet settled solid sample. The standard recovery and RPD met the requirements stated in the SAP (Smith, 1997). The PQL requirements were also met. A low level of ^{90}Sr was detected in the preparation blank. However, the level of contamination was below the reported detection limit and was insignificant with respect to the sample results. Therefore, the contamination does not affect the useability of these results.

Americium-241 (^{241}Am)/Curium-243/244 ($^{243/244}$Cm)

The ^{241}Am and $^{243/244}$Cm analyses were performed on the acid digested wet settled solid sample. They were determined by separation followed by alpha energy analysis. The standard recovery and RPD for ^{241}Am met the requirements stated in the SAP (Smith, 1997). The $^{243/244}$Cm results were reported as less than the detection limit. The reported detection limit did not meet the requested PQL because of the dilution required due to the beta and gamma activity. No reanalysis was performed.

A low level of ^{241}Am was detected in the preparation blank. However, the level of contamination was below the reported detection limit and was insignificant with respect to the sample results. Therefore, the contamination does not affect the useability of these results.

Plutonium-238, 239/240 (^{238}Pu, $^{239/240}$Pu)

The ^{238}Pu and $^{239/240}$Pu analyses were performed on the acid digested wet settled solid sample. The standard recovery and RPDs met the requirements stated in the SAP (Smith, 1997). The reported detection limit was slightly higher than the requested PQL because of the dilution required due to the beta and gamma activity. No reanalysis was performed.

A low level of ^{238}Pu was detected in the preparation blank. However, the level of contamination was below the reported detection limit and was insignificant with respect to the sample results. Therefore, the contamination does not affect the useability of these results.

Organic Analyses

Polychlorinated Biphenyls (PCB)

The PCB analysis was performed using the wet settled solids. The sample extraction was performed at the 222-S Laboratory and the gas chromatography/mass spectrometry (GC/MS) analysis was performed on the extract at the Waste Sampling and Characterization Facility (WSCF) Laboratory. The analytical results and discussion are provided in Attachment 4.

Volatile Organics Analysis (VOA)

The VOA analysis was performed using the wet settled solids. Two sample portions were sent to the Special Analytical Services (SAS) Laboratory for analysis by GC/MS using a purge and trap technique to separate and concentrate the volatiles (EPA methods 5030B and 8260B). The analytical results and discussion are provided in Attachment 5.

Semi-Volatile Organic Analysis (SVOA)

The SVOA analysis was performed using the wet settled solids. The sample extraction was performed at the 222-S Laboratory and the gas chromatography/mass spectrometry (GC/MS) analysis was performed on the extract at the WSCF laboratory. The analytical results and discussion are provided in Attachment 6.

Procedures

Table 4 lists the analytical procedures used for performing the safety screening analyses. Abbreviations for analyses are defined in the table notes.

Table 4: Analytical Procedures

Analysis	Preparation Procedure	Analysis Procedure
Physical and Inorganic Analyses		
Density	Direct Analysis	LT-519-103 Rev. A-0
Particle Size - seive test	Direct Analysis	LT-519-103 Rev. A-0
Particle Size Distribution	Direct Analysis	LT-519-101 Rev. A-1
% Water - Gravimetric	Direct Analysis	LA-564-101 Rev. G-0

Table 4: Analytical Procedures

Analysis	Preparation Procedure	Analysis Procedure
Physical and Inorganic Analyses		
% Solids - Gravimetric	Direct Analysis	LA-564-101 Rev. G-0
pH	Direct Analyses	LA-212-106 Rev. C-0
ICP	TCLP Extraction: LA-544-134 Rev. B-0 Extract Acid dig: LA-505-164 Rev. A-0 Sludge Acid dig.: LA-505-165 Rev. C-0	LA-505-161 Rev. C-2
% Undissolved Solids	N/A	LA-505-165 Rev. C-0
Hg	TCLP Extract - Direct Sludge - Direct	LA-325-104 Rev. E-0
Isotopic Uranium - ICP/MS	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-506-101 Rev. A-1
Radionuclide Analyses		
Total Alpha	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-508-101 Rev. G-0
Total Beta	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-508-101 Rev. G-0
GEA	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-548-121 Rev. F-0
^{90}Sr	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-220-101 Rev. E-1
^{241}Am, $^{243/244}Cm$	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-953-104 Rev. B-0
$^{238/239/240}Pu$	Sludge Acid dig.: LA-505-165 Rev. C-0	LA-953-104 Rev. B-0
Organic Analyses		
PCB	Extraction: LA-523-138 Rev. A-0	GC/MS: EPA Method 8082 per LOI Attachment 9
VOA	Purge and Trap: EPA Method 5030B	GC/MS: EPA Method 8260B
SVOA	Extraction: LA-523-138 Rev. A-0	GC/MS: LA-523-456 Rev. B-0

Abbreviations:

ICP = inductively coupled plasma spectrometry
Hg = mercury
ICP/MS = inductively coupled plasma spectrometry/ mass spectrometry
GEA = gamma energy analysis
^{90}Sr = strontium-90
^{241}Am = americium-241
$^{243/244}Cm$ = curium-243/244
$^{238/239/240}Pu$ = plutonium-238, plutonium-239/240
PCB = polychlorinated biphenyls
VOA = volatile organic analysis
SVOA = semi-volatile organic analysis

REFERENCES

Logan, T. E., and Kessner, J. H., 1997, *Letter of Instruction for Phase II Analytical Work for the 105-N Basin Sediment Disposition Task*, (Letter number 054333 to J. L. Jacobsen, December 22), Bechtel Hanford, Inc., Richland WA 99352. (Attachment 7)

Smith, R. C., 1997, *105-N Basin Sediment Disposition Phase-Two Sampling and Analysis Plan*, BHI-00984, Rev. 1, Bechtel Hanford, Inc., Richland, WA 99352.

Table 1: Data Summary Report
105N PHASE 2

CORE NUMBER: n/a
SEGMENT #: BOMPC8/9

SEGMENT PORTION: COMPOSITE

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S97N000074			Mercury by CVAA (Perkin Elmer)	ug/mL	47.80	<5.00e-03	<5.00e-03	<0.005	n/a	n/a	95.90	5.00e-03	n/a
S97N000075		C	Silver -ICP-Acid Digest-Liquid	ug/mL	75.05	<1.00e-02	1.03e-01	9.95e-02	1.01e-01	3.46	59.40	2.50e-02	n/a
S97N000075		C	Arsenic -ICP-Acid Digest-Liq	ug/mL	120.8	<1.00e-01	<2.50e-01	<2.50e-1	n/a	n/a	97.00	2.50e-01	n/a
S97N000075		C	Barium -ICP-Acid Digest-Liquid	ug/mL	68.20	<5.00e-02	3.280	3.200	3.240	2.47	102.0	1.25e-01	n/a
S97N000075		C	Beryllium -ICP-Acid Digest/Liq	ug/mL	n/a	<5.00e-03	<1.25e-02	<1.25e-2	n/a	n/a	0.00e+00	1.30e-02	n/a
S97N000075		C	Cadmium -ICP-Acid Digest-Liq	ug/mL	103.1	<5.00e-03	5.35e-02	5.53e-02	5.44e-02	3.31	107.0	1.30e-02	n/a
S97N000075		C	Chromium -ICP-Acid Digest-Liq	ug/mL	47.57	<1.00e-02	4.17e-02	<2.50e-2	n/a	n/a	102.8	2.50e-02	n/a
S97N000075		C	Nickel -ICP-Acid Digest-Liquid	ug/mL	n/a	<2.00e-02	2.23e-01	1.96e-01	2.10e-01	12.9	0.00e+00	5.00e-02	n/a
S97N000075		C	Lead -ICP-Acid Digest-Liquid	ug/mL	83.71	<1.00e-01	<2.50e-01	<2.50e-1	n/a	n/a	103.0	2.50e-01	n/a
S97N000075		C	Antimony -ICP-Acid Digest-Liq	ug/mL	n/a	<6.00e-02	<1.50e-01	<1.50e-1	n/a	n/a	0.00e+00	1.50e-01	n/a
S97N000075		C	Selenium -ICP-Acid Digest-Liq	ug/mL	97.83	<1.00e-01	<2.50e-01	<2.50e-1	n/a	n/a	100.0	2.50e-01	n/a
S97N000075		C	Thallium -ICP-Acid Digest-Liq	ug/mL	n/a	<2.00e-01	<5.00e-01	<5.00e-1	n/a	n/a	0.00e+00	5.00e-01	n/a
S97N000075		C	Vanadium -ICP-Acid Digest-Liq	ug/mL	n/a	<5.00e-02	<1.25e-01	<1.25e-1	n/a	n/a	0.00e+00	1.25e-01	n/a
S97N000076			Mercury by CVAA (Perkin Elmer)	ug/g	94.70	<5.00e-03	2.84e-01	2.45e-01	2.64e-01	14.7	66.60	6.10e-02	n/a
S97N000076			pH on SST Samples	pH	99.62	n/a	7.990	8.000	7.995	0.13	n/a	1.00e-02	n/a
S97N000076			Solids % - Gravimetric	%	103.5	n/a	42.20	45.50	43.85	7.53	n/a	1.00e-02	n/a
S97N000076			% Water by Gravimetric	%	99.15	n/a	57.80	54.50	56.15	5.88	n/a	1.00e-02	n/a
S97N000077			Undisolved solids in %	%	n/a	n/a	49.77	n/a	n/a	n/a	n/a	1.00e-02	n/a
S97N000077		C	Strontium-89/90 High Level	uCi/g	100.0	1.00e-03	2.680	2.690	2.685	0.37	n/a	1.00e-03	8.54E-01
S97N000077		C	Pu-239/240 by TRU-SPEC Resin	uCi/g	92.66	<7.27e-03	5.70e-01	5.97e-01	5.83e-01	4.63	n/a	3.30e-02	1.56E+00
S97N000077		C	Pu-238 by Ion Exchange	uCi/g	n/a	9.00e-03	9.68e-02	9.79e-02	9.73e-02	1.13	n/a	3.30e-02	2.38E+00
S97N000077		C	Uranium-233 by ICP/MS	ug/g	n/a	<1.58e-04	<1.54e-01	<1.72e-1	n/a	n/a	n/a	1.54e-01	n/a
S97N000077		C	Uranium-234 by ICP/MS	ug/g	n/a	<2.01e-04	2.49e-01	2.46e-01	2.47e-01	1.21	n/a	1.97e-01	n/a
S97N000077		C	Uranium-235 by ICP/MS	ug/g	n/a	<9.21e-05	19.37	19.80	19.59	2.04	n/a	9.00e-02	n/a
S97N000077		C	Uranium-236 by ICP/MS	ug/g	n/a	<1.88e-04	2.447	2.530	2.489	3.21	n/a	1.84e-01	n/a
S97N000077		C	Uranium-238 by ICP/MS	ug/g	108.5	<1.13e-04	2.13e+03	2.25e+03	2.19e+03	5.48	87.80	1.11e-01	n/a
S97N000077		C	Silver -ICP-Acid Digest	ug/g	86.67	<1.00e-02	< 7.150	<4.60e0	n/a	n/a	72.30	7.140	n/a
S97N000077		C	Aluminium -ICP-Acid Digest	ug/g	94.40	<5.00e-02	1.07e+04	1.03e+04	1.05e+04	3.81	11.24	35.70	n/a
S97N000077		C	Arsenic -ICP-Acid Digest	ug/g	96.00	<1.00e-01	< 71.50	<4.60e1	n/a	n/a	92.60	71.40	n/a
S97N000077		C	Boron -ICP-Acid Digest	ug/g	96.80	<5.00e-02	2.61e+02	239.0	250.0	8.80	88.60	35.70	n/a
S97N000077		C	Barium -ICP-Acid Digest	ug/g	99.20	<5.00e-02	1.34e+03	1.28e+03	1.31e+03	4.58	82.80	35.70	n/a
S97N000077		C	Beryllium -ICP-Acid Digest	ug/g	98.80	<5.00e-03	< 3.580	<2.30e0	n/a	n/a	93.80	3.570	n/a
S97N000077		C	Bismuth -ICP-Acid Digest	ug/g	96.20	<1.00e-01	< 71.50	<4.60e1	n/a	n/a	93.60	71.40	n/a
S97N000077		C	Calcium -ICP-Acid Digest	ug/g	101.6	1.74e-01	5.94e+03	6.52e+03	6.24e+03	8.97	-2.540e1	71.40	n/a
S97N000077		C	Cadmium -ICP-Acid Digest	ug/g	98.40	<5.00e-03	7.100	6.290	6.695	12.1	98.60	3.570	n/a
S97N000077		C	Cerium -ICP-Acid Digest	ug/g	96.20	<1.00e-01	< 71.50	<4.60e1	n/a	n/a	95.80	71.40	n/a
S97N000077		C	Cobalt -ICP-Acid Digest	ug/g	95.60	<2.00e-02	< 14.30	<9.20e0	n/a	n/a	92.00	14.30	n/a
S97N000077		C	Chromium -ICP-Acid Digest	ug/g	94.40	<1.00e-02	74.60	66.70	70.65	11.2	89.40	7.140	n/a
S97N000077		C	Copper -ICP-Acid Digest	ug/g	98.80	<1.00e-02	1.26e+02	175.0	150.5	32.6	85.40	7.140	n/a
S97N000077		C	Iron -ICP-Acid Digest	ug/g	92.80	7.00e-02	1.19e+04	1.14e+04	1.12e+04	3.57	-9.940e2	35.70	n/a
S97N000077		C	Potassium -ICP-Acid Digest	ug/g	94.80	<5.00e-01	<3.58e+02	<2.30e2	n/a	n/a	103.2	357.0	n/a
S97N000077		C	Lanthanum -ICP-Acid Digest	ug/g	96.00	<5.00e-02	< 35.80	<2.30e1	n/a	n/a	91.80	35.70	n/a
S97N000077		C	Lithium -ICP-Acid Digest	ug/g	94.80	<1.00e-02	< 7.150	11.40	n/a	n/a	90.40	7.140	n/a
S97N000077		C	Magnesium -ICP-Acid Digest	ug/g	96.00	<1.00e-01	8.44e+02	652.0	748.0	25.7	72.20	71.40	n/a

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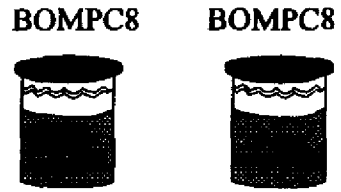
HNF-SD-WM-DP-289 REV. 0

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S97N000077		C	Manganese -ICP-Acid Digest	ug/g	94.20	<1.00e-02	2.42e+02	258.0	250.0	6.40	90.60	7.140	n/a
S97N000077		C	Molybdenum -ICP-Acid Digest	ug/g	95.60	<5.00e-02	< 35.80	<2.30e1	n/a	n/a	90.00	35.70	n/a
S97N000077		C	Sodium -ICP-Acid Digest	ug/g	103.0	1.06e-01	1.71e+02	97.60	134.3	54.7	96.60	71.40	n/a
S97N000077		C	Neodymium -ICP-Acid Digest	ug/g	93.60	<1.00e-01	< 71.50	<4.60e1	n/a	n/a	89.60	71.40	n/a
S97N000077		C	Nickel -ICP-Acid Digest	ug/g	96.60	<2.00e-02	63.40	56.80	60.10	11.0	92.40	14.30	n/a
S97N000077		C	Phosphorus -ICP-Acid Digest	ug/g	96.60	<2.00e-01	3.38e+02	334.0	336.0	1.19	86.80	143.0	n/a
S97N000077		C	Lead -ICP-Acid Digest	ug/g	93.80	<1.00e-01	2.51e+02	362.0	306.5	36.2	85.20	71.40	n/a
S97N000077		C	Sulfur -ICP-Acid Digest	ug/g	97.60	1.06e-01	5.58e+02	533.0	545.5	4.58	96.40	71.40	n/a
S97N000077		C	Antimony -ICP-Acid Digest	ug/g	95.60	<6.00e-02	< 42.90	<2.76e1	n/a	n/a	87.80	42.90	n/a
S97N000077		C	Selenium -ICP-Acid Digest	ug/g	90.80	<1.00e-01	< 71.50	<4.60e1	n/a	n/a	79.20	71.40	n/a
S97N000077		C	Silicon -ICP-Acid Digest	ug/g	96.80	8.30e-02	1.42e+03	1.36e+03	1.39e+03	4.32	1.380	35.70	n/a
S97N000077		C	Samarium -ICP-Acid Digest	ug/g	92.80	<1.00e-01	< 71.50	<4.60e1	n/a	n/a	89.40	71.40	n/a
S97N000077		C	Strontium -ICP-Acid Digest	ug/g	97.60	<1.00e-02	38.40	38.40	38.40	0.00	93.60	7.140	n/a
S97N000077		C	Titanium-ICP-Acid Digest	ug/g	88.40	<1.00e-02	2.00e+02	171.0	185.5	15.6	81.20	7.140	n/a
S97N000077		C	Thallium -ICP-Acid Digest	ug/g	91.60	<2.00e-01	<1.43e+02	<9.20e1	n/a	n/a	84.40	143.0	n/a
S97N000077		C	Uranium -ICP-Acid Digest	ug/g	91.40	<5.00e-01	2.39e+03	2.41e+03	2.40e+03	0.83	74.30	357.0	n/a
S97N000077		C	Vanadium -ICP-Acid Digest	ug/g	95.40	<5.00e-02	< 35.80	<2.30e1	n/a	n/a	92.80	35.70	n/a
S97N000077		C	Zinc -ICP-Acid Digest	ug/g	90.20	1.08e-01	1.15e+03	1.05e+03	1.10e+03	9.09	65.40	7.140	n/a
S97N000077		C	Zirconium -ICP-Acid Digest	ug/g	97.80	<1.00e-02	16.20	9.860	13.03	48.7	109.8	7.140	n/a
S97N000077		C	Sodium-22 by GEA	uCi/g	n/a	<2.51e-03	<5.88e-03	<4.53e-3	n/a	n/a	n/a	6.00e-03	n/a
S97N000077		C	Sodium-24 by GEA	uCi/g	n/a	<2.19e-03	<2.78e-03	<1.64e-3	n/a	n/a	n/a	3.00e-03	n/a
S97N000077		C	Potassium-40 by GEA	uCi/g	n/a	<9.14e-02	<9.37e-02	<6.00e-2	n/a	n/a	n/a	9.40e-02	n/a
S97N000077		C	Cobalt-56 by GEA	uCi/g	n/a	<2.14e-03	<5.97e-03	<4.47e-3	n/a	n/a	n/a	6.00e-03	n/a
S97N000077		C	Cobalt-57 by GEA	uCi/g	n/a	<1.22e-03	<3.01e-02	<2.81e-2	n/a	n/a	n/a	3.00e-02	n/a
S97N000077		C	Cobalt-60 by GEA	uCi/g	100.5	<2.33e-03	1.283	1.190	1.236	7.29	n/a	n/a	0.850
S97N000077		C	Selenium-75 by GEA	uCi/g	n/a	<2.31e-03	<5.61e-03	<4.23e-3	n/a	n/a	n/a	6.00e-03	n/a
S97N000077		C	Strontium-85 by GEA	uCi/g	n/a	<2.31e-03	<5.39e-03	<3.96e-3	n/a	n/a	n/a	5.00e-03	n/a
S97N000077		C	Yttrium-88 by GEA	uCi/g	n/a	<1.77e-03	<2.24e-03	<1.53e-3	n/a	n/a	n/a	2.00e-03	n/a
S97N000077		C	Niobium-94 by GEA	uCi/g	n/a	<2.28e-03	<6.64e-03	<4.93e-3	n/a	n/a	n/a	7.00e-03	n/a
S97N000077		C	Zr/Nb-95 by GEA	uCi/g	n/a	<4.68e-03	<1.25e-02	<9.52e-3	n/a	n/a	n/a	1.30e-02	n/a
S97N000077		C	Ruthenium-103 by GEA	uCi/g	n/a	<1.94e-03	<5.65e-03	<4.28e-3	n/a	n/a	n/a	6.00e-03	n/a
S97N000077		C	Ru/Rh-106 by GEA	uCi/g	n/a	<3.91e-02	<9.70e-02	<7.31e-2	n/a	n/a	n/a	9.70e-02	n/a
S97N000077		C	Cadmium-109 by GEA	uCi/g	n/a	<4.31e-02	<1.03e-01	<7.84e-2	n/a	n/a	n/a	1.03e-01	n/a
S97N000077		C	Tin-113 by GEA	uCi/g	n/a	<2.54e-03	<7.16e-03	<5.45e-3	n/a	n/a	n/a	7.00e-03	n/a
S97N000077		C	Iodine-131 by GEA	uCi/g	n/a	<1.99e-03	<5.23e-03	<3.96e-3	n/a	n/a	n/a	5.00e-03	n/a
S97N000077		C	Cesium-134 by GEA	uCi/g	n/a	<1.97e-03	<4.90e-03	<3.69e-3	n/a	n/a	n/a	5.00e-03	n/a
S97N000077		C	Cesium-137 by GEA	uCi/g	107.7	9.60e-03	3.267	3.010	3.138	8.28	n/a	n/a	0.620
S97N000077		C	Ce/Pr-144 by GEA	uCi/g	n/a	<1.88e-03	<4.28e-02	<3.28e-2	n/a	n/a	n/a	4.20e-02	n/a
S97N000077		C	Europium-152 by GEA	uCi/g	n/a	<1.01e-02	<1.32e-02	<8.61e-3	n/a	n/a	n/a	1.30e-02	n/a
S97N000077		C	Europium-154 by GEA	uCi/g	n/a	<7.29e-03	7.16e-02	7.64e-02	7.40e-02	6.62	n/a	n/a	13.5
S97N000077		C	Europium-155 by GEA	uCi/g	n/a	<5.23e-03	4.10e-02	3.70e-02	3.90e-02	10.3	n/a	n/a	28.1
S97N000077		C	Mercury-203 by GEA	uCi/g	n/a	<1.75e-03	<4.16e-03	<3.15e-3	n/a	n/a	n/a	4.00e-03	n/a
S97N000077		C	Thallium-208 by GEA	uCi/g	n/a	<2.26e-02	<5.38e-02	<4.06e-2	n/a	n/a	n/a	5.40e-02	n/a
S97N000077		C	Bismuth-212 by GEA	uCi/g	n/a	<3.45e-02	<7.38e-02	<5.43e-2	n/a	n/a	n/a	7.30e-02	n/a
S97N000077		C	Lead-212 by GEA	uCi/g	n/a	<3.46e-03	<7.47e-03	<5.31e-3	n/a	n/a	n/a	7.00e-03	n/a
S97N000077		C	Bismuth-214 by GEA	uCi/g	n/a	<8.90e-03	<1.16e-02	<8.77e-3	n/a	n/a	n/a	1.20e-02	n/a
S97N000077		C	Lead-214 by GEA	uCi/g	n/a	<2.36e-03	<4.78e-02	<3.54e-2	n/a	n/a	n/a	4.70e-02	n/a
S97N000077		C	Radium-224 by GEA	uCi/g	n/a	<3.57e-02	<8.09e-02	<6.08e-2	n/a	n/a	n/a	8.10e-02	n/a
S97N000077		C	Radium-226 by GEA	uCi/g	n/a	<3.46e-02	<7.85e-02	<5.90e-2	n/a	n/a	n/a	7.90e-02	n/a
S97N000077		C	Actinium-228 by GEA	uCi/g	n/a	<1.22e-02	<2.69e-02	<2.01e-2	n/a	n/a	n/a	2.70e-02	n/a
S97N000077		C	Thorium-228 by GEA	uCi/g	n/a	<1.41e-01	<3.11e-01	<2.36e-1	n/a	n/a	n/a	3.11e-01	n/a

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S97N000077		C	Thorium-229 by GEA	uCi/g	n/a	<6.20e-03	<1.45e-02	<1.10e-2	n/a	n/a	n/a	1.40e-02	n/a
S97N000077		C	Uranium/Thorium-233 by GEA	uCi/g	n/a	<1.220	< 2.966	<2.23e0	n/a	n/a	n/a	2.966	n/a
S97N000077		C	Protactinium-233 by GEA	uCi/g	n/a	<3.96e-03	<9.59e-03	<7.26e-3	n/a	n/a	n/a	1.00e-02	n/a
S97N000077		C	Protactinium-234m by GEA	uCi/g	n/a	<4.05e-03	<1.15e-02	<8.57e-3	n/a	n/a	n/a	1.20e-02	n/a
S97N000077		C	Thorium-234 by GEA	uCi/g	n/a	<8.45e-02	<1.95e-01	<1.43e-1	n/a	n/a	n/a	1.95e-01	n/a
S97N000077		C	Uranium-235 by GEA	uCi/g	n/a	<2.11e-03	<4.76e-03	<3.58e-3	n/a	n/a	n/a	5.00e-03	n/a
S97N000077		C	Neptunium-237 by GEA	uCi/g	n/a	<1.34e-02	<1.28e-01	<9.83e-2	n/a	n/a	n/a	1.28e-01	n/a
S97N000077		C	Neptunium-239 by GEA	uCi/g	n/a	<4.87e-03	<1.31e-02	<9.84e-3	n/a	n/a	n/a	1.30e-02	n/a
S97N000077		C	Plutonium-239 by GEA	uCi/g	n/a	<16.50	< 36.97	<2.79e1	n/a	n/a	n/a	36.97	n/a
S97N000077		C	Americium-241 by GEA	uCi/g	n/a	<1.35e-02	5.46e-01	5.34e-01	5.40e-01	2.22	n/a	n/a	7.47
S97N000077		C	Americium-243 by GEA	uCi/g	n/a	<4.17e-03	<8.74e-03	<6.40e-3	n/a	n/a	n/a	9.00e-03	n/a
S97N000077		C	Am-241 by Extraction	uCi/g	104.9	5.40e-02	5.52e-01	5.64e-01	5.58e-01	2.15	n/a	8.50e-02	2.03E+00
S97N000077		C	Cm-243/244 by Extraction	uCi/g	n/a	<4.07e-02	<8.53e-02	<6.91E-2	n/a	n/a	n/a	8.50e-02	1.00E+02
S97N000077		C	Alpha of Digested Solid	uCi/g	92.31	<7.14e-04	1.070	1.020	1.045	4.78	84.80	2.00e-03	2.21E+00
S97N000077		C	Beta of Solid Sample	uCi/g	105.2	4.00e-03	11.70	11.60	11.65	0.86	104.0	6.00e-03	5.29E-01

105 N Basin Phase Two



Remove standing water from above composited sludge

S97N000072 S97N000081

Composite contained 56.4% settled solids by mass

BOMPC8/9 is a composite that represents the wet settled solids after 14 hours settling

S97N000088

Analysis results represent the wet settled solids

S97N000073

S97N000074

TCLP Digest
Hg

S97N000075

Acid Digest
ICP: TCLP metals
+ Sb, Be, Ni, Tl & V

S97N000078

A portion of the wet settled solids used for Sieve Test & Particle Size

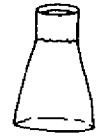
Additional portion of wet settled solids allowed to settle further (48 hrs), liquid removed settled density determined

Solids from settled density determination were centrifuged, liquid removed & centrifuged density determined

S97N000076

pH
Hg
Grav. % Water

Analysis results represent the wet settled solids



% Undissolved solids was determined after digestion

S97N000077

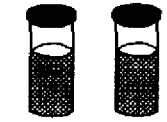
Acid Digest
ICP
ICP/MS - Isotopic U
Pu-238, 239/240
Am-241/Cm-243
GEA - full suite
AT/TB
Sr-90

Analysis results represent the wet settled solids

S97N000079

Extract for Semi-VOA and PCB

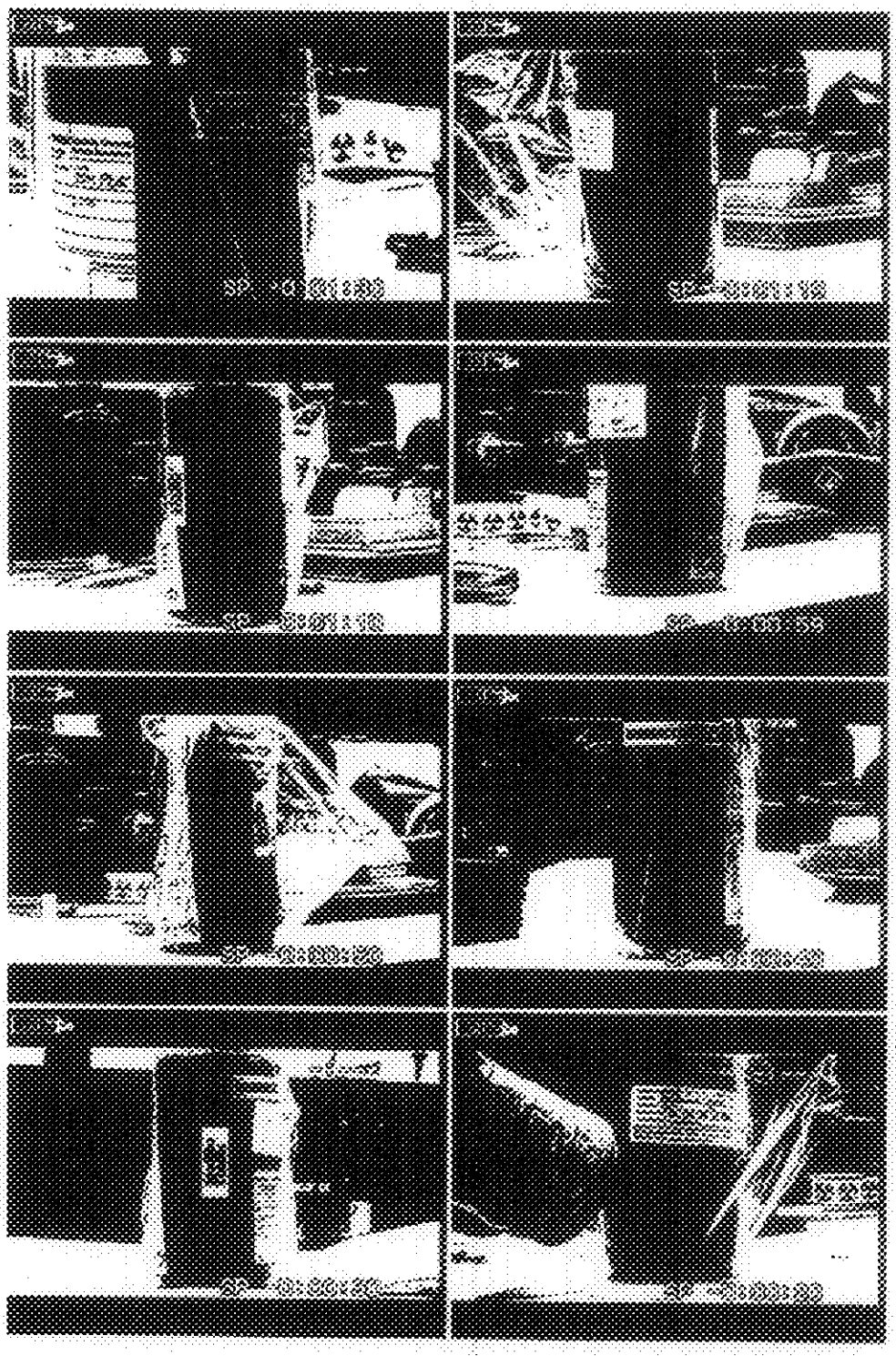
Analysis results represent the wet settled solids



S97N000080

VOA analysis by zero headspace

Analysis results represent the wet settled solids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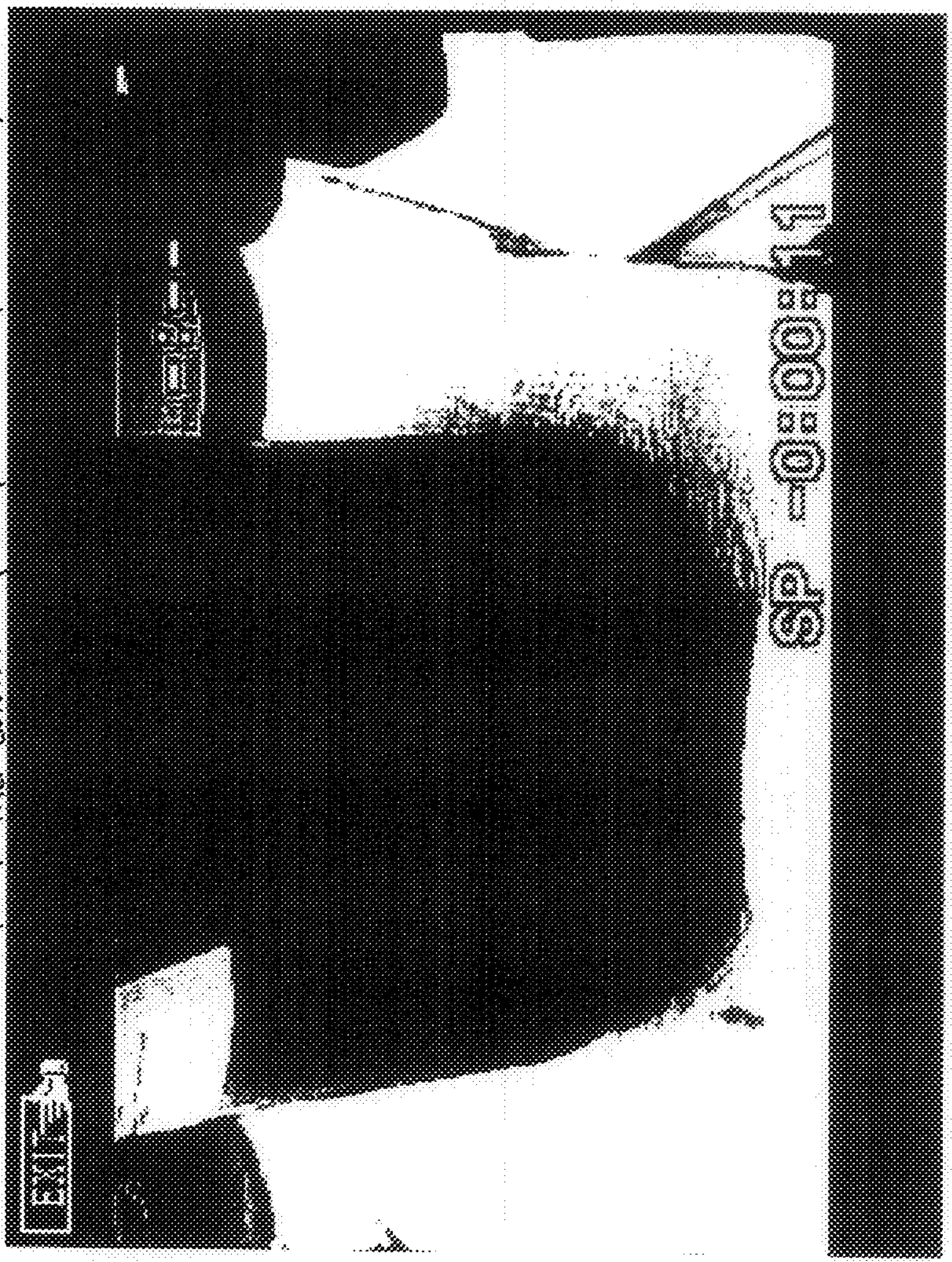
BOMPD1
BOMPD6
BOMPC8
BOMPD3
BOMPD4
BOMPC9



4L Bottle containing Composite sample BOMPC8/9

Graphics line indicates level of the of flocculent layer of solids

NHC
Numatec
Hanford Corporation
An SGN/Cogema, Inc. Company

Internal Memo

From: Process Chemistry 8C510-97-039
Phone: 373-4995 T6-07
Date: December 31, 1997
Subject: Physical Testing Results for 105-N Basin Phase 2 Sample

To: R. A. Esch T6-06

cc: D. A. Hardy T6-20
D. L. Herting DLH T6-07
J. R. Jewett T6-07
JFO File/LB

This letter reports the results of settled solids density, centrifuged solids density, wet sieve, and particle size distribution measurements conducted by Process Chemistry on sample S97N000078 from the 105-N Basin.

The settled and centrifuged solids measurements were completed on December 31, 1997 using Laboratory Technology Procedure LT-519-103 (Revision A-0). The settled and centrifuged solids densities for sample S97N000078 were determined to be 1.31 g/mL and 1.47 g/mL, respectively. The settled solids density was measured after a portion of the sediment was transferred into a centrifuge cone and allowed to sit undisturbed for two days. The cone was then centrifuged for greater than an hour and the centrifuged solids density was determined. All information associated with this testing was recorded in laboratory notebook HNF-N-22-1.

Laboratory Technology Procedure LT-519-103 (Revision A-0) was followed for the wet sieve test on the 105-N Basin sample. The sieve test consists of washing sediment through a #100 mesh (150 μm) sieve. The sediment was then dried and weighed to determine the weight percent of particles greater than 150 μm in diameter. On a dry weight basis, 97.3% of the particulates in sample S97N000078 were retained on the #100 mesh sieve. All information associated with this testing was recorded in laboratory notebook HNF-N-22-1. The sieve test was completed on December 30, 1997.

The results of the particle size distribution analysis of sample S97N000078 are presented in Attachment I. The wet sieve testing determined most of the solids in the sample to be greater than the 150 μm upper limit of the Brinkmann™ Model 2010 Particle Size Analyzer. Of the particles counted by the instrument, approximately 98% (number distribution) were less than 10 μm in diameter. The particulate mass (volume distribution) was spread over the 150 μm diameter range with the greatest concentration at the upper end of the range. The sediment sample probably also contains particles with diameters less than the 0.5 μm lower diameter limit of the instrument. Laboratory Technology Procedure LT-519-101 (Revision A-1) was followed for the particle size distribution analysis. All information associated with

Laboratory Technology Procedure LT-519-101 (Revision A-1) was followed for the particle size distribution analysis. All information associated with this testing was recorded in laboratory notebook RHO-RE-NB-208. The particle size analysis was completed on December 29, 1997.

If you have any questions on this letter, feel free to call me at 373-4995.

J. F. O'Rourke
Process Chemistry
Numatec Hanford Corporation

C. Dormant
Quality Assurance
Numatec Hanford Corporation

Attachment

POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS REPORT FOR SOLID SAMPLE FROM 105N

222-S Laboratory
February 1998

submitted by

GA Ross
Waste Management Federal Services of Hanford

POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS REPORT
FOR SOLID SAMPLE FROM 105N

SAMPLE ANALYSIS REPORTED

One waste sample was extracted (with duplicate, matrix spike, and matrix spike duplicate) for PCBs in solids by the 222-S laboratory. The sample extracts were analyzed (with duplicate, matrix spike, and matrix spike duplicate) for PCBs as Aroclor mixtures by the WSCF Laboratory. A soxhlet extraction procedure was used for extraction of the Aroclors from the sample. Analysis was performed using dual column confirmation gas chromatography/electron capture detection (GC/ECD). Extraction follows closely method 3540C of SW-846, analysis follows SW-846 method 8081.

A cross reference of laboratory sample number to the customer identification is given in the following table:

Sample Number	Customer ID
S97N00079	BOMPC8/C9 composite

SAMPLE DESCRIPTION, HANDLING, AND PREPARATION

The sample was variable in color and texture (the consistency of both sand and flocculant). After limited stirring four one gram aliquots were taken from the parent sample jar for analysis. Due to limited sample and radiation dose concerns a nominal one gram of sample was used for each analysis. Extraction of the samples was completed on December 27, 1997 in a radiological fume hood.

Preparation Procedure: LA-523-138 Rev. A0
Preparation Location: 222-S Laboratory, 200W Area, Hanford Site, Room 4P
Preparation Type: Soxhlet Extraction using methylene chloride, Kuderna-Danish concentration with solvent exchange to hexane and cleanup by sulfuric acid.
Sample Extract Storage: 4 degrees Celsius in darkness

ANALYSIS METHOD

GC/ECD Procedure: Per WSCF Analytical Laboratory LOI
GC/ECD instrumentation: HP-5890 Series II gas chromatograph with dual on-column injection, columns, and dual EC Detectors.

Location: WSCF Laboratory, 6266 Building, Room N9

The analysis was performed on January 20, 1998 on the extracts prepared December 27, 1997, and shipped to WSCF Laboratory on 1/5/98.

QUALITY CONTROL

Due to limited sample amount and radiological issues the extraction portion of the procedure is scaled down from SW-846 method 3540C. Appendix A of LA-523-138 details the deviations to method 3540C that are contained in the procedure. According to Kim Wehner, Organics Group Manager at WSCF Laboratory, analysis follows method 8081 of SW-846. Nominally, 1g of sample was extracted per analytical result.

Five point calibrations were run for the following aroclors: Concentration ranges went from 10 ng/mL to 500 ng/mL.

Quantitation was performed using a primary column and the secondary column was used for confirmation of identification. The following summarizes the QC requirements and adherence:

Table I.

QC Parameter	Comments
Target Compounds	Detection levels are based on sample size and the determination of MDLs from multiple injections of a low standard. Met requirements. (WSCF analytical files).
Surrogate Recoveries	Surrogate spiking was performed on all samples using TCX and DCB. No control limits have been established for these compounds in this matrix. Due to the large dilution factor (100X) used by the analyst, Ty Hamlin, surrogate spike levels are invalid.
Matrix Spike Recovery	A matrix spike and matrix spike duplicate using Aroclors 1016 and 1260 were performed. Due to the level of Aroclors in the sample, Spike amounts were less than the variability in the sample result. Hence, spike amounts and recoveries are invalid.
Method Blank Summary	A method blank was extracted and met requirements.
Initial Method Detection Limit Determination	Multiple extraction and analysis of a low concentration standard. Met requirements. (For 2g sample the MDL for 1248 = 3.71 ug/kg, documented in files.)
Initial Calibration	Five point calibrations were performed for Aroclors 1254 and 1260. Concentrations ranged from 10ng/mL to 500ng/mL.
Carry-over evaluation	An instrument blank was run after the calibration standards. No carry-over was detected. Met requirements.
Continuing Calibration Verifications	Initial calibration was performed during the sample sequence. Aroclor 1254 was used to assess ongoing instrument performance after the sample was analyzed.

Laboratory Control Sample	A matrix spike blank was used as a Laboratory Control Sample to assess method performance. This contained Aroclors 1016 and 1260. Recoveries of A1016/A1260 were 92.9%, and 91.8% respectively. This met the requirements (from 012398 SDG).

Laboratory bench sheets, data, chromatograms, and reports are maintained at the 222-S Laboratory. The initial calibration information and data is located in WSCF Laboratory, Building 6266, room N9, 600 Area.

RESULTS / DISCUSSION

The aroclor 1254 was observed in the sample, above the lower quantitation limit. The amounts for the extracts are reported in the attached WSCF Analytical Laboratory Report. Conversion of the results from WSCF (in ug/ml) are based on a wet weight basis (for 1g of sample extracted to 2ml) final hexane volume to produce values in mg/Kg. There were four aliquots, and four results. The values are 24mg/kg, 5.9mg/kg, 52mg/kg, and 8.9mg/kg. The average of these is 22.7 mg/kg quantified as Aroclor 1254. The standard deviation is 20.89.

The Aroclor concentrations found in the sample were much higher than the spike levels (200ppb), the MS/MSD amounts are smaller than the variability in the sample results. Hence, the MS/MSD values are invalid due to the spike concentration (0.2ppm) was much less than 25% of the sample concentration (23ppm). Rerun was not possible due to insufficient amount of sample or time to reextract. However, The Laboratory Control Spike recoveries were very good. An LCS was run at 222-S and the recoveries for 1016/1260 were 92.9%, and 91.8%, respectively. The LCS sent to WSCF Laboratory was quantified at 69.3% recovery for 1260. This is considered low. The analyst at WSCF did not quantitate the 1016 aroclor also present in the LCS.

Surrogate spiking was performed on all samples using Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB). No control limits have been established for these compounds in this matrix. USEPA advisory limits set at 50-150% further indicate surrogate recoveries for these samples is acceptable. Surrogate recoveries for the Blank, and the Laboratory Control samples were acceptable, but the sample was diluted too much to give a valid surrogate and matrix spike values.

Due to time constraints requested by the client, resampling and reanalysis was not performed. However, due to the variable nature of the sample, and the subsequent analytical results, this analyst recommends resampling and reanalysis of this unusual matrix. The data presented here can be viewed as estimated values.

Table II.
SAMPLE RESULTS

VIAL/SAMPLE	weight	Aroclor 1254	Aroclor 1260	TCX	DCB
919/S97N0079	1.021g	24mg/kg J	--	--D*	--D*
921/S97N0097D	1.011g	5.9mg/kg J	--	--D*	--D*
923/S97N0097MS	1.034g	52mg/kg J	--D*	--D*	--D*
925/S97N0079MSD	1.060g	8.9mg/kg J	--D*	--D*	--D*
905/Blank	2.0g	--	--	52%	54%
909/LCS	2.0g	--	63.9%	52%	52%
937/LCS	2.0g	--	91.8%	53%	69%

(Surrogate results for the non-diluted QC samples are within advisory limits of 50-150%. Diluted samples are flagged with "D*" to indicate that the spike was diluted out. Results are flagged with "J" to indicate estimated values.)

File: C:\WPDATA\ROSS\PCB00079.LET

ANALYST G H Ross DATE 2-4-98 REVIEWER Thomas Bubar DATE 2/4/98

Appendix A
Comparison to SW-846

Method 3540C, *Soxhlet Extraction*, Revision 3, December 1996

SW-846 States:	Procedure States:	Type of Change:	Reason for Change:
Section 7.2: Use 5 to 10 grams of sample	Step 9.5: Use 2 to 10 grams of sample	Deviation- allows scale down of the sample and spike additions appropriately (cut by approximately 1/4)	Due to limited amounts of samples, waste minimization and ALARA concerns, smaller amounts of sample may need to be used.
Section 7.4: Use 300 mL solvent	Step 9.5: Use 90 mL solvent.	Deviation- scale down of the sample, solvent, and spike additions appropriately (cut by approximately 1/4)	See above. This also reduces the amount of methylene chloride evaporated up the hood.
Section 7.4: Use 500 mL round flask.	Step 9.11: Use 125 mL round flask with flat bottom.	Deviation	Smaller flasks provide efficient extraction in limited hood space.
Section 7.10: Add approximately 50 mL exchange solvent once.	Steps 9.16.1 - 9.16.2: Add 30 mL of hexane three times	Deviation	Repeating process efficiently removes first solvent residue.
Section 7.12.2: Place the concentrator tube in a warm bath (35 °C) and evaporate to 0.5 mL...	9.25.1: Place the tube in the Reacti-vap evaporator assembly, with the heating module preheated to 40 °C... semivolatiles are collected when the $MeCl_2$ level reaches 2 mL.	Substitution	Heat transfer is done with a heating block instead of a bath, temperature differences are nominal. A final volume of 2 mL was necessary to prevent losses.

ANALYTICAL REPORT

for

FAST PROJECT FR8-7059
105N Basin

prepared for

Waste Management Federal Services Hanford
P.O. Box 700
Richland, Washington 99352

January 12, 1998

PROJECT NARRATIVE

In support of Project FR8-7059 at 105 N-Basin, Special Analytical Support was asked to analyze a sample for 38 Target List Compounds at a quantitation limit of 0.1 mg/kg. Sample FR8-7059 was received on December 29, 1997 for Volatile Organic Analysis (VOA) by EPA Method 8260B. The samples were 7 days into a 14 day holding time and were analyzed on the 11th day.

The sample matrix is a two phase system consisting of a fine powder and a liquid. The powder rapidly settles out of the liquid on standing. These samples are difficult to handle and it should be pointed out that analytical uncertainty is greater for non-homogeneous samples. The two phase sample could not be handled using gas tight syringes, handling protocol that is necessary for accurate analysis of gasses. The four gasses requested - bromomethane, chloromethane, chloroethane and vinyl chloride- were therefore not included in the report. The purge and trap system was calibrated using one phase water standards. Attempts were made to keep the phases mixed during sample preparation. Five ml sample aliquots were used for analysis and calculations.

A Purge and Trap technique, based on EPA methods 5030B and 8260B, was used to separate and concentrate the volatiles and GC/MS was used for identification and quantitation of the analytes. An OI 4460 automated purge and trap system coupled to an HP 5971 Mass Spectrometer was used for the analysis. The mass spectrometer was tuned to a Standard Spectra Autotune. Analytical standard preparation is documented in logbook WHC-N-1411-1 pages 95 through 97.

The Target List consists of thirty-eight volatile organic compounds. Five of those compounds - acetone, 2-butanone, ethyl cyanide, 2-hexanone, and carbon disulfide are flagged in Method 8260B with the statement that those compounds have poor purging efficiency resulting in high Estimated Quantitation Limits. An analytical standard for carbon disulfide was not available, the remaining four were included in the calibration standards. Two of the Target List compounds - 1-butanol and ethyl cyanide are flagged in EPA Method 8260B with the statement that the compounds are method analytes only when purged above 80 degrees Centigrade. The purge was not heated, so those compounds would not be quantified. The detector response to gaseous analytes - bromomethane, chloromethane, chloroethane and vinyl chloride - was too low for quantitative analysis, however, as discussed above, the two phase sample made analysis for the gases unreliable.

The GC/MS system was calibrated with commercially available standards containing 60 volatile organic compounds. A five point calibration from 5 to 100 ug/L using the internal standard method specified in EPA 8260B was performed. EPA Method 8260B states that if the relative standard deviation of the five response factors for each compound is less than 15%, then the response is considered linear over the calibration range and the average response factor may be used to calculate the amount in the sample. The linearity requirement was met for all of the Target List compounds with the exception of acetone and 2-butanone which, as mentioned above, are flagged in the method for poor purging efficiency. The characteristically low relative response factors for acetone and 2-butanone also contributes to a higher relative standard deviation when compared to halogenated hydrocarbons. Linear regression curve fits with r^2 values of 0.993 and 0.996 were used for acetone and 2-butanone calculations (regression curves are appended).

Two Continuing Calibration Verification Standards (CCVS) were analyzed during the run, one prior to and one immediately after sample analysis. According to EPA Method 8260B the calibration is valid if the deviation in the response factor is less than 20%. Of the 60 calibrated compounds, only acetone, 2-butanone and bromoform failed the calibration check.

A Laboratory Blank, containing surrogates and internal standards, and a System Blank consisting of unspiked water were analyzed to check for system interferences. Both blanks were negative for interference.

A Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were prepared by spiking the sample after it had been placed in the purge tube. The MS and MSD measure purging efficiency, not sample handling losses. Spike recoveries ranged from 94 to 106% with %RPDs of 8% or less.

Surrogates were added to the samples after the samples were transferred to the purge tubes. Surrogate recoveries ranged from 91 to 114%.

The response of the internal standards in samples, compared to the response of the internal standards in the daily calibration check, is monitored to determine the amount of correction that is applied in the internal standard calculation and to reject data when the response varies beyond established limits. Method 8260B allows the response of internal standards to change by a factor of two, -50% to +200%. The response for 1,4-dichlorobenzene-d4 in one sample changed by -56%, however, none of the Target List analytes were affected.

Chloroform was detected at a concentration above the highest calibration standard. The highest standard was 100 ug/L and the calculated chloroform concentrations are 140 and 150 ug/L, an RPD of 6.9%. The standard deviation of the five chloroform calibration standards was only 4.8%, indicating a very linear response between 5 and 100 ug/L. Calibration checks on chloroform during the analytical run were 2.6% and -4.1% deviation from the average response factor. The chloroform result is flagged with an "E" for estimated concentration, however, the linearity of the calibration curve and subsequent calibration checks suggest that a high level of confidence can be attached to the chloroform results.

The sample was analyzed in duplicate. The relative percent difference between the two duplicate samples was less than 7% for five analytes detected in the samples.

There were no TICs observed at reportable concentration levels.

Project FR8-7059 Data Summary
105 N-Basin

Category: Volatile Organic
Method: EPA 8260B
Matrix: Solid

FR8-7059

Sample Date: 12/23/97
Receipt Date: 12/29/97
Report Date: 1/12/97

*** - Exceeded Quality Control Requirements. See narrative.**
E - Estimated concentration, response above calibration range.
Q - Detected below calibration range

Client ID: S97N000080 / N Basin Duplicate
Data file: 01019813.D

Analyte	CAS Number	FR8-7059	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
Ethylbenzene	100-41-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L	Q	5	na
Styrene	100-42-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
cis-1,3-Dichloropropene	10061-01-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
trans-1,3-Dichloropropene	10061-02-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,2-Dichloroethane	107-06-2	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Ethyl cyanide	107-12-0	FR8-7059	1/2/98	1/2/98		µg/L		5	na
4-Methyl-2-Pentaone	108-10-1	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Toluene	108-88-3	FR8-7059	1/2/98	1/2/98	< 5	µg/L	Q	5	na
Chlorobenzene	108-90-7	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Dibromochloromethane	124-48-1	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Tetrachloroethene	127-18-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Xylenes (total)	1330-20-7	FR8-7059	1/2/98	1/2/98	5	µg/L		5	na
cis-1,2-Dichloroethylene	156-59-2	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
trans-1,2-Dichloroethylene	156-60-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,2-Dichloroethene (total)	540-59-0	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Carbon tetrachloride	56-23-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
2-Hexanone	591-78-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,1,2-Tetrachloroethane	630-20-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Acetone	67-64-1	FR8-7059	1/2/98	1/2/98	37	µg/L	*	5	na
Chloroform	67-66-3	FR8-7059	1/2/98	1/2/98	140	µg/L	E	5	na
1-Butanol	71-36-3	FR8-7059	1/2/98	1/2/98		µg/L		5	na
Benzene	71-43-2	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,1-Trichloroethane	71-55-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Bromomethane	74-83-9	FR8-7059	1/2/98	1/2/98		µg/L		5	na
Chloromethane	74-87-3	FR8-7059	1/2/98	1/2/98		µg/L		5	na
Chloroethane	75-00-3	FR8-7059	1/2/98	1/2/98		µg/L		5	na
Vinyl chloride	75-01-4	FR8-7059	1/2/98	1/2/98		µg/L		5	na
Methylenechloride	75-09-2	FR8-7059	1/2/98	1/2/98	5	µg/L		5	na
Carbon disulfide	75-15-0	FR8-7059	1/2/98	1/2/98		µg/L		5	na
Bromoform	75-25-2	FR8-7059	1/2/98	1/2/98	< 10	µg/L	*	10	na
Bromodichloromethane	75-27-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,1-Dichlorethane	75-34-3	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,1-Dichloroethene	73-35-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,2-Dichloropropane	78-87-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
2-Butanone	78-93-3	FR8-7059	1/2/98	1/2/98	10	µg/L	*	5	na
1,1,2-Tuichloroethane	79-00-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
Trichloroethene	79-01-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,2,2-Tetrachloroethane	79-34-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	na

Project FR8-7059 Data Summary
105 N-Basin

Category: Volatile Organic
Method: EPA 8260B
Matrix: Solid

Sample: FR8-7059 duplicate

Sample Date: 12/23/97
Receipt Date: 12/29/97
Report Date: 1/12/97

*** - Exceeded Quality Control Requirements. See narrative.**
E - Estimated concentration, response above calibration range.
Q - Detected below calibration range

Client ID: S97N000080 / N Basin Duplicate
Data File : 01019814.D

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
Ethylbenzene	100-41-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L	Q	5	
Styrene	100-42-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
cis-1,3-Dichloropropene	10061-01-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
trans-1,3-Dichloropropene	10061-02-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,2-Dichloroethane	107-06-2	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Ethyl cyanide	107-12-0	FR8-7059	1/2/98	1/2/98		µg/L		5	
4-Methyl-2-Pentaone	108-10-1	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Toluene	108-88-3	FR8-7059	1/2/98	1/2/98	< 5	µg/L	Q	5	
Chlorobenzene	108-90-7	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Dibromochloromethane	124-48-1	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Tetrachloroethene	127-18-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Xylenes (total)	1330-20-7	FR8-7059	1/2/98	1/2/98	5	µg/L		5	
cis-1,2-Dichloroethylene	156-59-2	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
trans-1,2-Dichloroethylene	156-60-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,2-Dichloroethene (total)	540-59-0	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Carbon tetrachloride	56-23-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
2-Hexanone	591-78-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,1,1,2-Tetrachloroethane	630-20-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Acetone	67-64-1	FR8-7059	1/2/98	1/2/98	38	µg/L	*	5	
Chloroform	67-66-3	FR8-7059	1/2/98	1/2/98	150	µg/L	E	5	
1-Butanol	71-36-3	FR8-7059	1/2/98	1/2/98		µg/L		5	
Benzene	71-43-2	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,1,1-Trichloroethane	71-55-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Bromomethane	74-83-9	FR8-7059	1/2/98	1/2/98		µg/L		5	
Chloromethane	74-87-3	FR8-7059	1/2/98	1/2/98		µg/L		5	
Chloroethane	75-00-3	FR8-7059	1/2/98	1/2/98		µg/L		5	
Vinyl chloride	75-01-4	FR8-7059	1/2/98	1/2/98		µg/L		5	
Methylenechloride	75-09-2	FR8-7059	1/2/98	1/2/98	5	µg/L		5	
Carbon disulfide	75-15-0	FR8-7059	1/2/98	1/2/98		µg/L		5	
Bromoform	75-25-2	FR8-7059	1/2/98	1/2/98	< 10	µg/L	*	10	
Bromodichloromethane	75-27-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,1-Dichlorethane	75-34-3	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,1-Dichloroethene	73-35-4	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,2-Dichloropropane	78-87-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
2-Butanone	78-93-3	FR8-7059	1/2/98	1/2/98	13	µg/L	*	5	
1,1,2-Ttichloroethane	79-00-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
Trichloroethene	79-01-6	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	
1,1,2,2-Tetrachloroethane	79-34-5	FR8-7059	1/2/98	1/2/98	< 5	µg/L		5	

Project FR8-7059 Data Summary
105 N-Basin

Category: Volatile Organic
Method: EPA 8260A
Matrix: Solid

Lab Blank 1411-1-97.08

Sample Date: 12/23/97
Receipt Date: 12/29/97
Report Date: 1/12/97

Client ID: S97N000080 / N Basin Duplicate
Data file: 01019813.D

E - Estimated concentration, response above calibration range.
Q - Detected below calibration range

Analyte	CAS Number	Sample	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
Ethylbenzene	100-41-4	Blank	1/2/98	1/2/98	< 5	µg/L	Q	5	na
Styrene	100-42-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
cis-1,3-Dichloropropene	10061-01-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
trans-1,3-Dichloropropene	10061-02-6	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,2-Dichloroethane	107-06-2	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Ethyl cyanide	107-12-0	Blank	1/2/98	1/2/98		µg/L		5	na
4-Methyl-2-Pentaone	108-10-1	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Toluene	108-88-3	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Chlorobenzene	108-90-7	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Dibromochloromethane	124-48-1	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Tetrachloroethene	127-18-4	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Xylenes (total)	1330-20-7	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
cis-1,2-Dichloroethylene	156-59-2	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
trans-1,2-Dichloroethylene	156-60-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,2-Dichloroethene (total)	540-59-0	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Carbon tetrachloride	56-23-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
2-Hexanone	591-78-6	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,1,2-Tetrachloroethane	630-20-6	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Acetone	67-64-1	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Chloroform	67-66-3	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1-Butanol	71-36-3	Blank	1/2/98	1/2/98		µg/L		5	na
Benzene	71-43-2	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,1-Trichloroethane	71-55-6	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Bromomethane	74-83-9	Blank	1/2/98	1/2/98		µg/L		5	na
Chloromethane	74-87-3	Blank	1/2/98	1/2/98		µg/L		5	na
Chloroethane	75-00-3	Blank	1/2/98	1/2/98		µg/L		5	na
Vinyl chloride	75-01-4	Blank	1/2/98	1/2/98		µg/L		5	na
Methylenechloride	75-09-2	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Carbon disulfide	75-15-0	Blank	1/2/98	1/2/98		µg/L		5	na
Bromoform	75-25-2	Blank	1/2/98	1/2/98	< 10	µg/L		10	na
Bromodichloromethane	75-27-4	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,1-Dichlorethane	75-34-3	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,1-Dichloroethene	73-35-4	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,2-Dichloropropane	78-87-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
2-Butanone	78-93-3	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,2-Ttichloroethane	79-00-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
Trichloroethene	79-01-6	Blank	1/2/98	1/2/98	< 5	µg/L		5	na
1,1,2,2-Tetrachloroethane	79-34-5	Blank	1/2/98	1/2/98	< 5	µg/L		5	na

Quality Control Parameters for sample FR8-7059

	Matrix Spike Recoveries				
		FR8-7059 MS	**FR8-7059 MSD**		
		Recovery in	Recovery in	%RPD	
	Analyte	nanograms	nanograms		
		and percent	and percent		
	1,1-Dichloroethene	50 ng (100%)	50 ng (100%)	0%	
	Benzene	47 ng (94%)	50 ng (100%)	6%	
	Toluene	49 ng (98%)	51 ng (102%)	4%	
	Trichloroethene	45 ng (90%)	48 ng (96%)	6%	
	Chlorobenzene	49 ng (98%)	53 ng (106%)	8%	
	Surrogate Recoveries				
	SAMPLE	Dibromofluoro-	Dichloroethane-d4	Toluene-d8	Data File
		methane			
	FR8-7059	112%	114%	105%	01019813.D
	FR8-7059	104%	105%	91%	01019814.D
	FR8-7059 MS	104%	105%	96%	01019815.D
	FR8-7059 MSD	102%	103%	94%	01019816.D
	Internal Standard Recoveries				
		Fluorobenzene	Chlorobenzene-d5	1,4-Dichloro-	
				benzene-d4	
	CCVS	100%	100%	100%	01019810.D
	FR8-7059	80%	72%	52%	01019813.D
	FR8-7059	77%	67%	44%	01019814.D
	FR8-7059 MS	90%	81%	56%	01019815.D
	FR8-7059 MSD	94%	84%	60%	01019816.D
	Sample Duplicate				
	Analyte	FR8-7059	FR8-7059 duplicate	RPD	
	Xylenes	5 ug/L	5 ug/L	0	
	Acetone	51 ug/L	51 ug/L	0	
	Chloroform	140 ug/L	150 ug/L	6.90%	
	Methylene chloride	5 ug/L	5 ug/L	0	
	2-butanone	17 ug/L	16 ug/L	5.90%	

CHAIN-OF-CUSTODY INFORMATION

FR8-7059

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No.

Page 1 of 1

Collector: 222-S Laboratory	Contact/Requestor: Marty Martin/Ruth Esch	Telephone No.: 373-4314 MSIN: T6-06 FAX: 372-1878
SAF No.	Sample Origin: 222-S Laboratory	Purchase Order/Charge Code: MD009
Project Title: N Basin Sample to SAS	Logbook No.	Ice Chest No. Temp.
Shipped To (Lab): SAS MO-254 600 Area	Method of Shipment	Bill of Lading/Air Bill No.
Protocol	Data Turnaround	Offsite Property No.

Sample No.	Lab ID	*	Date	Time	No./Type Container	Sample Analysis	Preservative
NBasin Samp	S97N000080	SO	12/23/97		1/40mL	sample wt. 53.62g FR8-7059-01	n/a
NBasin Dup	S97N000080	SO	12/23/97		1/40mL	sample wt. 55.74g FR8-7059-01D	n/a

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS ☐ Yes ☒ No

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SPECIAL INSTRUCTIONS Hold Time

Ship samples to MO-254 600 Area
Attention Joy Smith or
Larry Lockard.

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
T.H. Steen / [signature]	12/29/97 10:00	MARTY L. MARTIN / [signature]	12-29-97 1000
MARTY L. MARTIN / [signature]	12-29-97 1100	O.K. Work / [signature]	12-29-97 1100
O.K. Work / [signature]	12/29/97 11:15	Joy Smith / [signature]	12/29/97 1115

Matrix*

S = Soil		DS = Drum Solids	
SE = Sediment		DL = Drum Liquids	
SO = Solid		T = Tissue	
SL = Sludge		WI = Wipe	
W = Water		L = Liquid	
O = Oil		V = Vegetation	
A = Air		X = Other	

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

DISTRIBUTION: White - Remain with Samples Color - Customer

BC-6000-828 (12/95)

HNF-SD-WM-DP-289 REV. 0

SEMIVOLATILE (SVOA) ANALYSIS REPORT FOR SOLID SAMPLE FROM 105N

222-S Laboratory
February 1998

submitted by

GA Ross
Waste Management Federal Services of Hanford

SEMIVOA (SVOA) ANALYSIS REPORT
FOR SOLID SAMPLE FROM 105N

SAMPLE ANALYSIS REPORTED

One waste sample was analyzed (with duplicate, matrix spike, and matrix spike duplicate) for SVOAs by the Inorganic/Organic Chemistry Group. A soxhlet extraction procedure was used for extraction of the semivolatile organic compounds from the sample. Analysis was performed using gas chromatography/mass selective detection (GC/MS). Extraction follows closely method 3540C of SW-846, analysis follows SW-846 method 8270.

A cross reference of laboratory sample number to the customer identification is given in the following table:

Sample Number	Customer ID
S97N000079	BOMPC8/C9 Composite

SAMPLE DESCRIPTION, HANDLING, AND PREPARATION

The sample was variable in color and texture. After limited stirring four one gram aliquots were taken from the parent sample jar for analysis. Due to limited sample and radiation dose concerns a nominal one gram of sample was used for each analysis. Extraction of the LCS, blank, and initial QC proficiency samples were completed on December 16, 1998 and the sample, sample duplicate, MS, MSD were completed on December 27, 1998, in a radiological fume hood.

Preparation Procedure: LA-523-138 Rev. A0
Preparation Location: 222-S Laboratory, 200W Area, Hanford Site, Room 4P
Preparation Type: Soxhlet Extraction using methylene chloride/acetone, Kuderna-Danish concentration.
Sample Extract Storage: 4 degrees Celsius in darkness

ANALYSIS METHOD

GC/MS Procedure: 8270
GC/ECD instrumentation: HP-5890 Series II gas chromatograph with 5971 Mass Selective Detector (MSD), sv402.i

Location: WSCF Laboratory, Building 6266, Room N11

The analysis was performed on January 23, 1998 on the extracts obtained on December 16, and December 27, 1997.

QUALITY CONTROL

Due to limited sample amount and radiological issues the extraction portion of the procedure is scaled down from SW-846 method 3540C. Appendix A of LA-523-138 details the deviations to method 3540C that are contained in the procedure. Analysis follows method 8270 of SW-846. Nominally, 1g of sample was extracted per analytical result.

Initial five point calibration was performed on 12/27/97. A continuing calibration confirmation was performed before each set of samples. An instrument blank was analyzed after the continuing calibration prior to the sample analysis.

Quantitation was performed using the RFs of the initial calibration. A detailed description of the specific procedure requirements is available in the procedure. The following summarizes the QC requirements and adherence:

Table I.

QC Parameter	Comments
Target Compounds	Detection levels are based on sample size and the determination of MDL specified in the method (Results Summary).
Surrogate Recoveries	Surrogate spiking was performed on all samples. Surrogate recoveries were all within limits. (Surrogate Recovery Report).
Matrix Spike Recovery	A matrix spike and matrix spike duplicate was performed. RPD's and Spike recoveries were acceptable. One spike, Pentachlorophenol, had high recovery possibly due to calibration error. (MS/MSD Recovery Summary).
Method Blank Summary	A method blank was extracted and met requirements.
Initial Method Detection Limit Determination	Multiple extraction and analysis of a low concentration standard. Values reported are per the method 8270, and depend on the amount of sample, and are reflected on the result summary forms. Met requirements.
Tuning	The instrument tune check was performed with DFTPP. Met all requirements (Tune Check Report).
Initial Calibration	Five point calibrations were performed at WSCF for the RCRA 8270 or CLP 3/91 compounds on 12/29/97. Met requirements. (The calibration files were not sent to 222-S Lab, hence no initial calibration form 7 can be prepared here.)
Continuing Calibration Verifications	Initial calibration was confirmed as valid with continuing calibrations. Met requirements (Continuing Calibration Compounds Report).

Laboratory Control Sample	A matrix spike blank was used as a Laboratory Control Sample to assess method performance. This contained the BN and Acids Matrix Spikes, and BN and Acids Surrogate Spikes. All spike recoveries were within limits for the sample called "LCS2".

Laboratory bench sheets, data, chromatograms, and reports are maintained in room 3B at the 222-S Laboratory. The initial calibration information and data is located on the HP UNIX system, Chemsys2.

RESULTS

The Target compounds Diethylphthalate, Di-n-butylphthalate, and bis(2-Ethyhexyl)phthalate were observed in the BLANK. The Target compounds Di-n-butylphthalate, Butylbenzylphthalate, and bis(2-Ethyhexyl)phthalate were detected in the sample, but were below the Quantitation Limit. The amounts are reported in the attached Target Compound Result Summaries.

The non-target compounds, an Unknown, Hexadecane, Heptadecane, and Nonadecane were observed in the sample and the sample duplicate. A non-target ketone compound showed up in the Blank, and LCS sample, but not in the sample. However, this is not a target compound and therefore the impact is minimal.

Flags used:
U (undetected, number is detection limit),
J (below quantitation limit)
N (non-target, estimated value),
E (above calibration level),
B (compound found in Blank)

File: C:\WPDATA\ROSS\SVOA00079.LET

ANALYST _____ DATE 2/3/98 REVIEWER _____ DATE 2/3/98

Appendix A
Comparison to SW-846

Method 3540C, *Soxhlet Extraction*, Revision 3, December 1996

SW-846 States:	Procedure States:	Type of Change:	Reason for Change:
Section 7.2: Use 5 to 10 grams of sample	Step 9.5: Use 2 to 10 grams of sample	Deviation- allows scale down of the sample and spike additions appropriately (cut by approximately 1/4)	Due to limited amounts of samples, waste minimization and ALARA concerns, smaller amounts of sample may need to be used.
Section 7.4: Use 300 mL solvent	Step 9.5: Use 90 mL solvent.	Deviation- scale down of the sample, solvent, and spike additions appropriately (cut by approximately 1/4)	See above. This also reduces the amount of methylene chloride evaporated up the hood.
Section 7.4: Use 500 mL round flask.	Step 9.11: Use 125 mL round flask with flat bottom.	Deviation	Smaller flasks provide efficient extraction in limited hood space.
Section 7.10: Add approximately 50 mL exchange solvent once.	Steps 9.16.1 - 9.16.2: Add 30 mL of hexane three times	Deviation	Repeating process efficiently removes first solvent residue.
Section 7.12.2: Place the concentrator tube in a warm bath (35 °C) and evaporate to 0.5 mL...	9.25.1: Place the tube in the Reacti-vap evaporator assembly, with the heating module preheated to 40 °C... semivolatiles are collected when the $MeCl_2$ level reaches 2 mL.	Substitution	Heat transfer is done with a heating block instead of a bath, temperature differences are nominal. A final volume of 2 mL was necessary to prevent losses.

Client Name: | Client SDG: 980108-2.b

Client Sample ID: BLANK | Sample Date: 00/00/00

Sample Location: | Sample Point:

Lab Sample ID: BLANK | Date Received: 00/00/00

Sample Type: SOIL | Date Reported: 01/08/98

Analysis Type: SV | Level: LOW

Data Type: MS DATA | Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2	Phenol	3300.00	U
111-44-4	bis(-2-Chloroethyl)Ether	3300.00	U
95-57-8	2-Chlorophenol	3300.00	U
541-73-1	1,3-Dichlorobenzene	3300.00	U
106-46-7	1,4-Dichlorobenzene	3300.00	U
95-50-1	1,2-Dichlorobenzene	3300.00	U
95-48-7	2-Methylphenol	3300.00	U
108-60-1	2,2'-oxybis(1-Chloropropane)	3300.00	U
106-44-5	4-Methylphenol	3300.00	U
621-64-7	N-Nitroso-di-n-propylamine	3300.00	U
67-72-1	Hexachloroethane	3300.00	U
98-95-3	Nitrobenzene	3300.00	U
78-59-1	Isophorone	3300.00	U
88-75-5	2-Nitrophenol	3300.00	U
105-67-9	2,4-Dimethyphenol	3300.00	U
111-91-1	bis(-2-Chloroethoxy)methane	3300.00	U
120-83-2	2,4-Dichlorophenol	3300.00	U
120-82-1	1,2,4-Trichlorobenzene	3300.00	U
91-20-3	Naphthalene	3300.00	U
106-47-8	4-Chloroaniline	3300.00	U
87-68-3	Hexachlorobutadiene	3300.00	U
59-50-7	4-Chloro-3-Methylphenol	3300.00	U
91-57-6	2-Methylnaphthalene	3300.00	U
77-47-4	Hexachlorocyclopentadiene	3300.00	U
88-06-2	2,4,6-Trichlorophenol	3300.00	U
95-95-4	2,4,5-Trichlorphenol	3300.00	U
91-58-7	2-Chloronaphthalene	3300.00	U
88-74-4	2-Nitroaniline	3300.00	U
131-11-3	Dimethylphthalate	3300.00	U
208-96-8	Acenaphthylene	3300.00	U
606-20-2	2,6-Dinitrotoluene	3300.00	U
99-09-2	3-Nitroaniline	3300.00	U
83-32-9	Acenaphthene	3300.00	U
51-28-5	2,4-Dinitrophenol	3300.00	U
100-02-7	4-Nitrophenol	3300.00	U

Client Name: Client SDG: 980108-2.b

Client Sample ID: BLANK Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: BLANK Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
132-64-9	Dibenzofuran	3300.00	U
121-14-2	2,4-Dinitrotoluene	3300.00	U
84-66-2	Diethylphthalate	290.00	J
7005-72-3	4-Chlorophenyl-phenylether	3300.00	U
86-73-7	Fluorene	3300.00	U
100-01-6	4-Nitroaniline	3300.00	U
534-52-1	4,6-Dinitro-2-methylphenol	3300.00	U
86-30-6	N-nitrosodiphenylamine (1)	3300.00	U
101-55-3	4-Bromophenyl-phenylether	3300.00	U
118-74-1	Hexachlorobenzene	3300.00	U
87-86-5	Pentachlorophenol	3300.00	U
85-01-8	Phenanthrene	3300.00	U
120-12-7	Anthracene	3300.00	U
84-74-2	Di-n-butylphthalate	4000.00	
206-44-0	Fluoranthene	3300.00	U
129-00-0	Pyrene	3300.00	U
85-68-7	Butylbenzylphthalate	3300.00	U
91-94-1	3,3'-Dichlorobenzidine	3300.00	U
56-55-3	Benzo(a)anthracene	3300.00	U
218-01-9	Chrysene	3300.00	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000.00	J
117-84-0	Di-n-octylphthalate	3300.00	U
205-99-2	Benzo(b)fluoranthene	3300.00	U
207-08-9	Benzo(k)fluoranthene	3300.00	U
50-32-8	Benzo(a)pyrene	3300.00	U
193-39-5	Indeno(1,2,3-cd)pyrene	3300.00	U
53-70-3	Dibenzo(a,h)anthracene	3300.00	U
191-24-2	Benzo(g,h,i)perylene	3300.00	U

Client Name:

Client SDG: 980108-2.b

Client Sample ID: BLANK

Sample Date: 00/00/00

Sample Location:

Sample Point:

Lab Sample ID: BLANK.

Date Received: 00/00/00

Sample Type: SOIL

Date Reported: 01/08/98

Analysis Type: SV

Level: LOW

Data Type: MS DATA

Column Number: 1

Number TICs found: 13

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 141-79-7	3-Penten-2-one, 4-methyl-	3.854	40000.00	NJ
2.	Unknown	4.157	28000.00	J
3. 123-42-2	2-Pentanone, 4-hydroxy-4-met	4.322	1600000.00	NJ
4.	Unknown	4.812	3400.00	J
5.	Unknown	4.842	22000.00	J
6.	Unknown	4.929	5000.00	J
7.	Unknown	5.037	8000.00	J
8.	Unknown	5.319	8400.00	J
9.	Unknown	5.475	4000.00	J
10.	Unknown	6.800	3700.00	J
11.	Unknown	7.549	6900.00	J
12. 102-76-1	Triacetin	7.977	3500.00	NJ
13. 84-69-5	1,2-Benzenedicarboxylic acid	13.387	5000.00	NJ

222-S Laboratory

TARGET COMPOUNDS

Client Name:
Lab Smp Id: S97N000079
Sample Location:
Sample Date:
Sample Matrix: SOIL
Analysis Type: SV
Data Type: MS DATA
Misc Info: S97N000079

Client SDG: 980108-2.b
Client Smp ID: S97N000079
Sample Point:
Date Received:
Quant Type: ISTD
Level: LOW
Operator: cad

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/KG) ug/Kg	Q
108-95-2	Phenol	6400	U
111-44-4	bis(-2-Chloroethyl)Ether	6400	U
95-57-8	2-Chlorophenol	6400	U
541-73-1	1,3-Dichlorobenzene	6400	U
106-46-7	1,4-Dichlorobenzene	6400	U
95-50-1	1,2-Dichlorobenzene	6400	U
95-48-7	2-Methylphenol	6400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	6400	U
106-44-5	4-Methylphenol	6400	U
621-64-7	N-Nitroso-di-n-propylamine	6400	U
67-72-1	Hexachloroethane	6400	U
98-95-3	Nitrobenzene	6400	U
78-59-1	Isophorone	6400	U
88-75-5	2-Nitrophenol	6400	U
105-67-9	2,4-Dimethyphenol	6400	U
111-91-1	bis(-2-Chloroethoxy)methane	6400	U
120-83-2	2,4-Dichlorophenol	6400	U
120-82-1	1,2,4-Trichlorobenzene	6400	U
91-20-3	Naphthalene	6400	U
106-47-8	4-Chloroaniline	6400	U
87-68-3	Hexachlorobutadiene	6400	U
59-50-7	4-Chloro-3-Methylphenol	6400	U
91-57-6	2-Methylnaphthalene	6400	U
77-47-4	Hexachlorocyclopentadiene	6400	U
88-06-2	2,4,6-Trichlorophenol	6400	U
95-95-4	2,4,5-Trichlorphenol	6400	U
91-58-7	2-Chloronaphthalene	6400	U
88-74-4	2-Nitroaniline	6400	U
131-11-3	Dimethylphthalate	6400	U
606-20-2	2,6-Dinitrotoluene	6400	U
208-96-8	Acenaphthylene	6400	U
99-09-2	3-Nitroaniline	6400	U
83-32-9	Acenaphthene	6400	U
51-28-5	2,4-Dinitrophenol	6400	U
100-02-7	4-Nitrophenol	6400	U
121-14-2	2,4-Dinitrotoluene	6400	U
132-64-9	Dibenzofuran	6400	U

222-S Laboratory HNF-SD-WM-DP-289 REV. 0

TARGET COMPOUNDS

Client Name:
Lab Smp Id: S97N000079
Sample Location:
Sample Date:
Sample Matrix: SOIL
Analysis Type: SV
Data Type: MS DATA
Misc Info: S97N000079

Client SDG: 980108-2.b
Client Smp ID: S97N000079
Sample Point:
Date Received:
Quant Type: ISTD
Level: LOW
Operator: cad

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/KG) ug/Kg	Q
84-66-2	Diethylphthalate	6400	U
86-73-7	Fluorene	6400	U
7005-72-3	4-Chlorophenyl-phenylether	6400	U
100-01-6	4-Nitroaniline	6400	U
534-52-1	4,6-Dinitro-2-methylphenol	6400	U
86-30-6	N-nitrosodiphenylamine (1)	6400	U
101-55-3	4-Bromophenyl-phenylether	6400	U
118-74-1	Hexachlorobenzene	6400	U
87-86-5	Pentachlorophenol	6400	U
85-01-8	Phenanthrene	6400	U
120-12-7	Anthracene	6400	U
84-74-2	Di-n-butylphthalate	3100	JB
206-44-0	Fluoranthene	6400	U
129-00-0	Pyrene	6400	U
85-68-7	Butylbenzylphthalate	1500	J
56-55-3	Benzo(a)anthracene	6400	U
91-94-1	3,3'-Dichlorobenzidine	6400	U
218-01-9	Chrysene	6400	U
117-81-7	bis(2-Ethylhexyl)phthalate	6100	JB
117-84-0	Di-n-octylphthalate	6400	U
205-99-2	Benzo(b)fluoranthene	6400	U
207-08-9	Benzo(k)fluoranthene	6400	U
50-32-8	Benzo(a)pyrene	6400	U
193-39-5	Indeno(1,2,3-cd)pyrene	6400	U
53-70-3	Dibenzo(a,h)anthracene	6400	U
191-24-2	Benzo(g,h,i)perylene	6400	U
367-12-4	2-Fluorophenol	140000	
4165-62-2	Phenol-d5	150000	
4165-60-0	Nitrobenzene-d5	76000	
321-60-8	2-Fluorobiphenyl	82000	
118-79-6	2,4,6-Tribromophenol	160000	
98904-43-9	Terphenyl-d14	93000	

222-S Laboratory

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
Lab Smp Id: S97N000079
Operator : cad
Sample Location:
Sample Matrix: SOIL
Analysis Type: SV

Client SDG: 980108-2.b
Client Smp ID: S97N000079
Sample Date:
Sample Point:
Date Received:
Level: LOW

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/KG) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 3587-64-2	2-Propanol, 1-methoxy-2-met	4.039	3900	NJ
2.	Unknown	5.023	5600	J
3. 544-76-3	Hexadecane	10.669	6800	NJ
4. 629-78-7	Heptadecane	11.721	9500	NJ
5. 629-92-5	Nonadecane	13.757	4900	NJ

Client Name: Client SDG: 980108-2.b

Client Sample ID: S97N000079DUP Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: S97N000079DU Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2	Phenol	6500.00	U
111-44-4	bis(-2-Chloroethyl)Ether	6500.00	U
95-57-8	2-Chlorophenol	6500.00	U
541-73-1	1,3-Dichlorobenzene	6500.00	U
106-46-7	1,4-Dichlorobenzene	6500.00	U
95-50-1	1,2-Dichlorobenzene	6500.00	U
95-48-7	2-Methylphenol	6500.00	U
108-60-1	2,2'-oxybis(1-Chloropropane)	6500.00	U
106-44-5	4-Methylphenol	6500.00	U
621-64-7	N-Nitroso-di-n-propylamine	6500.00	U
67-72-1	Hexachloroethane	6500.00	U
98-95-3	Nitrobenzene	6500.00	U
78-59-1	Isophorone	6500.00	U
88-75-5	2-Nitrophenol	6500.00	U
105-67-9	2,4-Dimethyphenol	6500.00	U
111-91-1	bis(-2-Chloroethoxy)methane	6500.00	U
120-83-2	2,4-Dichlorophenol	6500.00	U
120-82-1	1,2,4-Trichlorobenzene	6500.00	U
91-20-3	Naphthalene	6500.00	U
106-47-8	4-Chloroaniline	6500.00	U
87-68-3	Hexachlorobutadiene	6500.00	U
59-50-7	4-Chloro-3-Methylphenol	6500.00	U
91-57-6	2-Methylnaphthalene	6500.00	U
77-47-4	Hexachlorocyclopentadiene	6500.00	U
88-06-2	2,4,6-Trichlorophenol	6500.00	U
95-95-4	2,4,5-Trichlorphenol	6500.00	U
91-58-7	2-Chloronaphthalene	6500.00	U
88-74-4	2-Nitroaniline	6500.00	U
131-11-3	Dimethylphthalate	6500.00	U
208-96-8	Acenaphthylene	6500.00	U
606-20-2	2,6-Dinitrotoluene	6500.00	U
99-09-2	3-Nitroaniline	6500.00	U
83-32-9	Acenaphthene	6500.00	U
51-28-5	2,4-Dinitrophenol	6500.00	U
100-02-7	4-Nitrophenol	6500.00	U

Client Name: Client SDG: 980108-2.b

Client Sample ID: S97N000079DUP Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: S97N000079DU Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
132-64-9	Dibenzofuran	6500.00	U
121-14-2	2,4-Dinitrotoluene	6500.00	U
84-66-2	Diethylphthalate	6500.00	U
7005-72-3	4-Chlorophenyl-phenylether	6500.00	U
86-73-7	Fluorene	6500.00	U
100-01-6	4-Nitroaniline	6500.00	U
534-52-1	4,6-Dinitro-2-methylphenol	6500.00	U
86-30-6	N-nitrosodiphenylamine (1)	6500.00	U
101-55-3	4-Bromophenyl-phenylether	6500.00	U
118-74-1	Hexachlorobenzene	6500.00	U
87-86-5	Pentachlorophenol	6500.00	U
85-01-8	Phenanthrene	6500.00	U
120-12-7	Anthracene	6500.00	U
84-74-2	Di-n-butylphthalate	3100.00	JB
206-44-0	Fluoranthene	6500.00	U
129-00-0	Pyrene	6500.00	U
85-68-7	Butylbenzylphthalate	1000.00	J
91-94-1	3,3'-Dichlorobenzidine	6500.00	U
56-55-3	Benzo(a)anthracene	6500.00	U
218-01-9	Chrysene	6500.00	U
117-81-7	bis(2-Ethylhexyl)phthalate	5000.00	JB
117-84-0	Di-n-octylphthalate	6500.00	U
205-99-2	Benzo(b)fluoranthene	6500.00	U
207-08-9	Benzo(k)fluoranthene	6500.00	U
50-32-8	Benzo(a)pyrene	6500.00	U
193-39-5	Indeno(1,2,3-cd)pyrene	6500.00	U
53-70-3	Dibenzo(a,h)anthracene	6500.00	U
191-24-2	Benzo(g,h,i)perylene	6500.00	U

Client Name:

Client SDG: 980108-2.b

Client Sample ID: S97N000079DUP

Sample Date: 00/00/00

Sample Location:

Sample Point:

Lab Sample ID: S97N000079DU

Date Received: 00/00/00

Sample Type: SOIL

Date Reported: 01/08/98

Analysis Type: SV

Level: LOW

Data Type: MS DATA

Column Number: 1

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	4.048	4400.00	J
2. 544-76-3	Hexadecane	10.668	7200.00	NJ
3. 629-78-7	Heptadecane	11.721	9200.00	NJ
4. 629-92-5	Nonadecane	13.756	5000.00	NJ

Client Name: Client SDG: 980108-2.b

Client Sample ID: S97N000079MS Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: S97N000079MS Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2	Phenol	150000.00	
111-44-4	bis(-2-Chloroethyl)Ether	6600.00	U
95-57-8	2-Chlorophenol	140000.00	
541-73-1	1,3-Dichlorobenzene	6600.00	U
106-46-7	1,4-Dichlorobenzene	72000.00	
95-50-1	1,2-Dichlorobenzene	6600.00	U
95-48-7	2-Methylphenol	6600.00	U
108-60-1	2,2'-oxybis(1-Chloropropane)	6600.00	U
106-44-5	4-Methylphenol	6600.00	U
621-64-7	N-Nitroso-di-n-propylamine	72000.00	
67-72-1	Hexachloroethane	6600.00	U
98-95-3	Nitrobenzene	6600.00	U
78-59-1	Isophorone	6600.00	U
88-75-5	2-Nitrophenol	6600.00	U
105-67-9	2,4-Dimethyphenol	6600.00	U
111-91-1	bis(-2-Chloroethoxy)methane	6600.00	U
120-83-2	2,4-Dichlorophenol	6600.00	U
120-82-1	1,2,4-Trichlorobenzene	78000.00	
91-20-3	Naphthalene	6600.00	U
106-47-8	4-Chloroaniline	6600.00	U
87-68-3	Hexachlorobutadiene	6600.00	U
59-50-7	4-Chloro-3-Methylphenol	170000.00	
91-57-6	2-Methylnaphthalene	6600.00	U
77-47-4	Hexachlorocyclopentadiene	6600.00	U
88-06-2	2,4,6-Trichlorophenol	6600.00	U
95-95-4	2,4,5-Trichlorphenol	6600.00	U
91-58-7	2-Chloronaphthalene	6600.00	U
88-74-4	2-Nitroaniline	6600.00	U
131-11-3	Dimethylphthalate	6600.00	U
208-96-8	Acenaphthylene	6600.00	U
606-20-2	2,6-Dinitrotoluene	6600.00	U
99-09-2	3-Nitroaniline	6600.00	U
83-32-9	Acenaphthene	85000.00	
51-28-5	2,4-Dinitrophenol	6600.00	U
100-02-7	4-Nitrophenol	180000.00	

Client Name: Client SDG: 980108-2.b

Client Sample ID: S97N000079MS Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: S97N000079MS Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
132-64-9	Dibenzofuran	6600.00	U
121-14-2	2,4-Dinitrotoluene	90000.00	
84-66-2	Diethylphthalate	6600.00	U
7005-72-3	4-Chlorophenyl-phenylether	6600.00	U
86-73-7	Fluorene	6600.00	U
100-01-6	4-Nitroaniline	6600.00	U
534-52-1	4,6-Dinitro-2-methylphenol	6600.00	U
86-30-6	N-nitrosodiphenylamine (1)	6600.00	U
101-55-3	4-Bromophenyl-phenylether	6600.00	U
118-74-1	Hexachlorobenzene	6600.00	U
87-86-5	Pentachlorophenol	220000.00	E
85-01-8	Phenanthrene	6600.00	U
120-12-7	Anthracene	6600.00	U
84-74-2	Di-n-butylphthalate	3800.00	JB
206-44-0	Fluoranthene	6600.00	U
129-00-0	Pyrene	100000.00	
85-68-7	Butylbenzylphthalate	1200.00	J
91-94-1	3,3'-Dichlorobenzidine	6600.00	U
56-55-3	Benzo(a)anthracene	6600.00	U
218-01-9	Chrysene	6600.00	U
117-81-7	bis(2-Ethylhexyl)phthalate	7300.00	B
117-84-0	Di-n-octylphthalate	6600.00	U
205-99-2	Benzo(b)fluoranthene	6600.00	U
207-08-9	Benzo(k)fluoranthene	6600.00	U
50-32-8	Benzo(a)pyrene	6600.00	U
193-39-5	Indeno(1,2,3-cd)pyrene	6600.00	U
53-70-3	Dibenzo(a,h)anthracene	6600.00	U
191-24-2	Benzo(g,h,i)perylene	6600.00	U

Client Name:

Client SDG: 980108-2.b

Client Sample ID: S97N000079MS

Sample Date: 00/00/00

Sample Location:

Sample Point:

Lab Sample ID: S97N000079MS

Date Received: 00/00/00

Sample Type: SOIL

Date Reported: 01/08/98

Analysis Type: SV

Level: LOW

Data Type: MS DATA

Column Number: 1

Number TICs found: 6

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 5842-53-5	3-Penten-1-ol, 2,2,4-trimeth	5.023	4600.00	NJ
2. 2199-69-1	Benzene-1,2,3,4-d4-, 5,6-dic	5.667	54000.00	NJ
3. 544-76-3	Hexadecane	10.675	7600.00	NJ
4. 629-78-7	Heptadecane	11.718	9500.00	NJ
5. 629-92-5	Nonadecane	13.755	5200.00	NJ
6. 57-10-3	Hexadecanoic acid	14.340	10000.00	NJ

Client Name: Client SDG: 980108-2.b

Client Sample ID: S97N000079MSD Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: S97N000079MS Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2	Phenol	140000.00	
111-44-4	bis(-2-Chloroethyl)Ether	6200.00	U
95-57-8	2-Chlorophenol	140000.00	
541-73-1	1,3-Dichlorobenzene	6200.00	U
106-46-7	1,4-Dichlorobenzene	71000.00	
95-50-1	1,2-Dichlorobenzene	6200.00	U
95-48-7	2-Methylphenol	6200.00	U
108-60-1	2,2'-oxybis(1-Chloropropane)	6200.00	U
106-44-5	4-Methylphenol	6200.00	U
621-64-7	N-Nitroso-di-n-propylamine	71000.00	
67-72-1	Hexachloroethane	6200.00	U
98-95-3	Nitrobenzene	6200.00	U
78-59-1	Isophorone	6200.00	U
88-75-5	2-Nitrophenol	6200.00	U
105-67-9	2,4-Dimethyphenol	6200.00	U
111-91-1	bis(-2-Chloroethoxy)methane	6200.00	U
120-83-2	2,4-Dichlorophenol	6200.00	U
120-82-1	1,2,4-Trichlorobenzene	77000.00	
91-20-3	Naphthalene	6200.00	U
106-47-8	4-Chloroaniline	6200.00	U
87-68-3	Hexachlorobutadiene	6200.00	U
59-50-7	4-Chloro-3-Methylphenol	160000.00	
91-57-6	2-Methylnaphthalene	6200.00	U
77-47-4	Hexachlorocyclopentadiene	6200.00	U
88-06-2	2,4,6-Trichlorophenol	6200.00	U
95-95-4	2,4,5-Trichlorphenol	6200.00	U
91-58-7	2-Chloronaphthalene	6200.00	U
88-74-4	2-Nitroaniline	6200.00	U
131-11-3	Dimethylphthalate	6200.00	U
208-96-8	Acenaphthylene	6200.00	U
606-20-2	2,6-Dinitrotoluene	6200.00	U
99-09-2	3-Nitroaniline	6200.00	U
83-32-9	Acenaphthene	83000.00	
51-28-5	2,4-Dinitrophenol	6200.00	U
100-02-7	4-Nitrophenol	180000.00	

Client Name: Client SDG: 980108-2.b

Client Sample ID: S97N000079MSD Sample Date: 00/00/00

Sample Location: Sample Point:

Lab Sample ID: S97N000079MS Date Received: 00/00/00

Sample Type: SOIL Date Reported: 01/08/98

Analysis Type: SV Level: LOW

Data Type: MS DATA Column Number: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
132-64-9	Dibenzofuran	6200.00	U
121-14-2	2,4-Dinitrotoluene	88000.00	
84-66-2	Diethylphthalate	6200.00	U
7005-72-3	4-Chlorophenyl-phenylether	6200.00	U
86-73-7	Fluorene	6200.00	U
100-01-6	4-Nitroaniline	6200.00	U
534-52-1	4,6-Dinitro-2-methylphenol	6200.00	U
86-30-6	N-nitrosodiphenylamine (1)	6200.00	U
101-55-3	4-Bromophenyl-phenylether	6200.00	U
118-74-1	Hexachlorobenzene	6200.00	U
87-86-5	Pentachlorophenol	210000.00	E
85-01-8	Phenanthrene	6200.00	U
120-12-7	Anthracene	6200.00	U
84-74-2	Di-n-butylphthalate	4500.00	JB
206-44-0	Fluoranthene	6200.00	U
129-00-0	Pyrene	99000.00	
85-68-7	Butylbenzylphthalate	1100.00	J
91-94-1	3,3'-Dichlorobenzidine	6200.00	U
56-55-3	Benzo(a)anthracene	6200.00	U
218-01-9	Chrysene	6200.00	U
117-81-7	bis(2-Ethylhexyl)phthalate	7000.00	B
117-84-0	Di-n-octylphthalate	6200.00	U
205-99-2	Benzo(b)fluoranthene	6200.00	U
207-08-9	Benzo(k)fluoranthene	6200.00	U
50-32-8	Benzo(a)pyrene	6200.00	U
193-39-5	Indeno(1,2,3-cd)pyrene	6200.00	U
53-70-3	Dibenzo(a,h)anthracene	6200.00	U
191-24-2	Benzo(g,h,i)perylene	6200.00	U

Client Name:

Client SDG: 980108-2.b

Client Sample ID: S97N000079MSD

Sample Date: 00/00/00

Sample Location:

Sample Point:

Lab Sample ID: S97N000079MS

Date Received: 00/00/00

Sample Type: SOIL

Date Reported: 01/08/98

Analysis Type: SV

Level: LOW

Data Type: MS DATA

Column Number: 1

Number TICs found: 7

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 75-85-4	2-Butanol, 2-methyl-	4.058	4000.00	NJ
2. 3855-82-1	1,4-Dichlorobenzene-d4	5.677	54000.00	NJ
3. 102-76-1	Triacetin	7.986	5500.00	NJB
4. 544-76-3	Hexadecane	10.674	7500.00	NJ
5. 629-78-7	Heptadecane	11.718	9900.00	NJ
6. 629-92-5	Nonadecane	13.755	5300.00	NJ
7. 57-11-4	Octadecanoic acid	16.220	6700.00	NJ

SAMPLE INFORMATION SUMMARY

BATCH: /chem/gar.b

Data File	Injection Date	Sample Type	Dil Factor	Inst ID	Method	Method Batch
dftpp01.d	08-JAN-1998 10:28	DFTPP	1.00	sv402	2rdftpp.m	980108-2.b
sstd040.d	08-JAN-1998 10:47	Continuing Cal	1.00	sv402	8270.m	980108-2.b
W980000155.d	08-JAN-1998 14:37	Unknown	1.00	sv402	8270.m	gar.b
W980000156.d	08-JAN-1998 15:10	Unknown	1.00	sv402	8270.m	gar.b
W980000157.d	08-JAN-1998 15:50	MS	1.00	sv402	8270.m	gar.b
W980000158.d	08-JAN-1998 16:32	MSD	1.00	sv402	8270.m	gar.b
W980000159.d	08-JAN-1998 17:15	Unknown	1.00	sv402	8270.m	wscf.b
dftpp02.d	08-JAN-1998 17:57	DFTPP	1.00	sv402	2rdftpp.m	980108-2.b
sstd040B.d	08-JAN-1998 18:17	Continuing Cal	1.00	sv402	8270.m	980108-2.b
W980000160.d	08-JAN-1998 18:58	Unknown	1.00	sv402	8270.m	wscf.b
W980000161.d	08-JAN-1998 19:41	Unknown	1.00	sv402	8270.m	wscf.b
W980000162.d	08-JAN-1998 20:23	Unknown	1.00	sv402	8270.m	wscf.b
W980000163.d	08-JAN-1998 21:05	Unknown	1.00	sv402	8270.m	wscf.b
W980000164.d	08-JAN-1998 21:48	Unknown	1.00	sv402	8270.m	wscf.b

Data File	Matrix	Fraction	Lab Sample ID	Lab Prep Batch	Client Sample ID	Client Sample Group
dftpp01.d	LIQUID	SV	dftpp01	980108-2.b	dftpp01	980108-2.b
sstd040.d	LIQUID	SV	sstd040	980108-2.b	sstd040	980108-2.b
W980000155.d	SOLID	SV	S97N000079	980108-2.b*NA	911	980108-2.b
W980000156.d	SOLID	SV	S97N000079DUP	980108-2.b*NA	913	980108-2.b
W980000157.d	SOLID	SV	S97N000079MS	980108-2.b*NA	915	980108-2.b
W980000158.d	SOLID	SV	S97N000079MSD	980108-2.b*NA	917	980108-2.b
W980000159.d	SOLID	SV	BLANK	980108-2.b*NA	907	980108-2.b
dftpp02.d	LIQUID	SV	dftpp02	980108-2.b	dftpp02	980108-2.b
sstd040B.d	LIQUID	SV	sstd040B	980108-2.b	sstd040B	980108-2.b
W980000160.d	SOLID	SV	LCS1	980108-2.b*NA	899	980108-2.b
W980000161.d	SOLID	SV	LCS2	980108-2.b*NA	901	980108-2.b
W980000162.d	SOLID	SV	QC SPK1	980108-2.b*NA	891	980108-2.b
W980000163.d	SOLID	SV	QC SPK2	980108-2.b*NA	893	980108-2.b
W980000164.d	SOLID	SV	QC SPK3	980108-2.b*NA	895	980108-2.b

Data File	Compound Sublist	Spike List File	Sample Ref #	QC Group Ref #	Init Cal Ref #	Batch Ref #
dftpp01.d	all.sub		21005067	112023698	367179	61003907
sstd040.d	ccc&spcc.sub	WaterMsd.spk	21005069	112023698	112023320	112023622
W980000155.d	222.sub	SoilMsd.spk	21005056	112023698	112023320	21005055
W980000156.d	222.sub	WaterMsd.spk	21005057	112023698	112023320	21005055
W980000157.d	222.sub	SoilMsd.spk	21005058	112023698	112023320	21005055
W980000158.d	222.sub	SoilMsd.spk	21005059	112023698	112023320	21005055
W980000159.d	222.sub	WaterMsd.spk	21005060	112023698	112023320	112023622
dftpp02.d	all.sub		21005068	112023699	367179	61003907
sstd040B.d	ccc&spcc.sub	WaterMsd.spk	21005070	112023699	112023320	112023622
W980000160.d	222.sub	WaterMsd.spk	21005061	112023699	112023320	112023622
W980000161.d	222.sub	WaterMsd.spk	21005062	112023699	112023320	112023622
W980000162.d	222.sub	WaterMsd.spk	21005063	112023699	112023320	112023622
W980000163.d	222.sub	WaterMsd.spk	21005064	112023699	112023320	112023622
W980000164.d	222.sub	WaterMsd.spk	21005065	112023699	112023320	112023622

BATCH: /chem/gar.b

Data File	Injection Date	Sample Type	Dil Factor	Inst ID	Method	Method Batch
W980000165.d	08-JAN-1998 22:29	Unknown	1.00	sv402	8270.m	gar.b

Data File	Matrix	Fraction	Lab Sample ID	Lab Prep Batch	Client Sample ID	Client Sample Group
W980000165.d	SOLID	SV	QC SPK4	980108-2.bNA	897	980108-2.b

Data File	Compound Sublist	Spike List File	Sample Ref #	QC Group Ref #	Init Cal Ref #	Batch Ref #
W980000165.d	222.sub	WaterMsd.spk	21005066	112023699	112023320	21005055

Bechtel

3350 George Washington Way
Richland, WA 99352
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054333

Job No. 22192
Written Response Required NO
Due Date: N/A
Actionee N/A
Closes CCN N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code 9080

DEC 2 2 1997

Fluor Daniel Hanford, Inc.
J. L. Jacobsen, Director
Contract Administration
P.O. Box 1000, MSIN B3-70
Richland, Washington 99352

Subject: **LETTER OF INSTRUCTION FOR PHASE II ANALYTICAL WORK FOR THE 105-N BASIN SEDIMENT DISPOSITION TASK**

Dear Mr. Jacobsen:

The analytical requirements associated with the Phase II 105-N Basin Sediment Disposition Task samples are defined in the attached Analytical Instructions (AI). The AI documents the technical and administrative requirements required by this work. Additionally, work order DB8224 is attached authorizing the work required by this Letter of Instruction (LOI).

This LOI is for sediment samples only. The samples are projected to be sent to the laboratory during the week of December 21, 1997. Two samples are expected to be delivered to the laboratory. One sample will be used to characterize the 105-N Basin sediment for radioactive, chemical, and physical parameters as described in the attached AI. The second sample will be used for process control plan (PCP) testing per directions provided by Chem Nuclear Inc. One cementation test billet produced as a result of the PCP testing may require a metals leachability analysis using the Toxicity Characteristic Leaching Procedure (TCLP) as described in the attached AI. Direction to proceed with the TCLP testing on this cementation test billet will be provided by the Environmental Restoration Contractor (ERC) following the completion of PCP testing.

The characterization sample will be processed through the 222-S Analytical Laboratory with a 45-calendar day turnaround time. The 222-S Analytical Laboratory has agreed to provide preliminary radiochemistry, TCLP, and physical properties data for the characterization sample no later than 15 calendar days (excluding holidays) following the receipt of the sample. The balance of the preliminary data is due to the ERC no later than 30 calendar days (excluding holidays) following sample receipt. The final data package will be submitted to the ERC no later than 45 calendar days (excluding holidays) following sample receipt.

If TCLP testing is required for the cementation test billet, discussed above, the TCLP data will be due to the ERC within 15 calendar days (excluding holidays) following the direction to proceed from the

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ERC. If PCP testing has not been completed prior to the laboratory receiving direction to proceed with TCLP testing, the 15-calendar day turnaround clock will start upon completion of the PCP testing. The costs established in the attached cost estimate will not be exceeded. Ms. J. H. Kessner will be the contact for this effort. Questions regarding this LOI may be directed to her on 373-6797.

Sincerely,

T. E. Logan
Project Manager, N Area Project

SJT:man

Attachments: (1) Analytical Instructions
(2) 222-S Cost Estimate
(3) Work Order DB8224

cc: R. L. Bisping (FDH) N1-26, w/a
D. B. Hardy (WMH) T6-20, w/a
A. G. King (WMH) T6-03, w/a
L. F. Perkins, Jr. (WMH) T6-14, w/a

ANALYTICAL INSTRUCTIONS: PHASE TWO ANALYTICAL WORK FOR THE 105-N BASIN SEDIMENT DISPOSITION TASK

J. H. Kessner, Program Manager
BHI, Analytical Services

12/16/97
Date

J. C. Plastino, Engineer
N Area Project Quality Services

12/16/97
Date

L. F. Perkins, Manager
222-S Analytical Laboratories

12-17-97
Date

G. M. Duncan, Project Engineer
BHI, 105-N Basin Project

12/16/97
Date

ANALYTICAL INSTRUCTIONS: PHASE TWO ANALYTICAL WORK FOR THE 105-N BASIN SEDIMENT DISPOSITION TASK

1.0 SUMMARY OF SERVICES REQUIRED

The objective of this Analytical Instructions (AI) is to provide the Environmental Restoration Contractor's (ERC) N-Basin Cleanout project manager with analytical services in support of sediment sample analysis required for Phase Two of the 105-N Basin Sediment Disposition task. This AI is intended to manage this analytical work scope and provide guidance concerning its performance to the Project Hanford Management Contractor's 222-S Analytical Laboratory (222-S), the designated analytical services provider. Radiological, chemical, and physical parameter analyses of sediment samples is required using standard laboratory-specific methods. Unless otherwise specified, all references to days in this AI are calendar days.

Phase Two of the 105-N Basin Sediment Disposition task consists of one sampling activity. The objective is to provide data to support characterization of the materials present and information to allow optimization of disposal techniques. Work order #DB8224 provides funding for implementation of this AI.

Analytical services include, but are not limited to: sample receipt, handling and storage, analytical measurements, submittal of data analysis reports (deliverables), and return/disposal of residual sample material. Detailed analytical requirements for Phase Two of the 105-N Basin Sediment Disposition task are presented in *105-N Basin Sediment Disposition Phase 2 Sampling and Analysis Plan* (105-N Basin Sediment Phase 2 SAP) (BHI, 1997). Any deviations between the AI and the SAP are superseded by this AI.

222-S must possess and maintain the ability to provide analytical results for radiological, chemical, and physical parameters. The laboratory shall perform the applicable analyses, prepare and submit deliverables, and operate within quality assurance/quality control (QA/QC) parameters as specified in this AI, the referenced 105-N Basin Sediment Phase 2 SAP, and the *222-S Laboratory Quality Assurance Plan*, QAPP-016 (RUST, 1997).

222-S shall supply all facilities, equipment, materials, documents, and personnel necessary for the performance of work in accordance with the requirements of this AI unless otherwise specified. The laboratory shall have available the facilities and equipment - including hot cells - required for receipt, handling, storage, and analysis of radioactive samples. Use of other laboratories for analytical support under this AI shall be at the discretion (documented by written approval) of the N-Basin Cleanout project manager.

Laboratory-specific analytical and standard operating procedures (SOPs), and QA documents

utilized by 222-S for performance of work under this AI shall address the requirements of all applicable regulations and reflect the actual operating conditions in effect during analysis of ERC samples. If requested, controlled copies of the documents shall be provided and may be subject to ERC review and acceptance.

The ERC anticipates that all data and documentation generated under this AI may be subjected to regulatory and public scrutiny. All data and documentation may also be discoverable in any resulting legal proceedings. Therefore, it is important for the laboratory to maintain and demonstrate the security and integrity of ERC samples, data, and documentation.

The N-Basin Cleanout project manager requests that 222-S review this AI for content and clarity. Acceptance of the work order will be viewed as acceptance of the outlined work scope and associated requirements, procedures, and methods.

2.0 TECHNICAL REQUIREMENTS

2.1 Sample Characteristics

The samples to be submitted for analysis under this AI are classified as other solid (sediment) matrix containing hazardous chemical materials and radioactive contamination. Previous analysis of this material has found detectable levels of barium, cadmium, chromium, nickel, lead, mercury, and polychlorinated biphenyls (PCBs). Maximum PCB contamination levels from previous samples were approximately 200 ppm. Radioactive contamination includes reactor fission products such as radioactive strontium, cobalt, and cesium, and actinide series elements such as uranium, plutonium, and americium. Estimates of percent solid material average 20 percent solid.

There will be at least one sediment sample requiring analysis. Samples will be provided primarily as wet sediment with standing water on top in the sample containers. The maximum measured dose rate of radioactive samples is anticipated to be approximately 2000 millirem/hr, on contact. Much larger dose rates are not expected but may be encountered. Specific information regarding the samples will be obtained during sampling and will be provided to 222-S before the samples arrive at the laboratory.

Portions of the sediment sample will be used to test cementation parameters. After completion of the cementation tests (cementation testing is not a part of this Analytical Instruction) some of the resulting test "billets" will be selected for further chemical analysis. At least three billets are expected to be selected for chemical analysis for metals leachability using the Toxicity Characteristic Leaching Procedure (TCLP).

2.2 Analytical Requirements

222-S shall have and maintain the ability to perform radiological, chemical, and physical parameter analyses according to applicable industry-standard protocols and methods when available. Analysis is to be performed on the sediment portion of the material sent for analysis and on the cementation test billets. No analyses are required at this time on the liquid fraction of the samples.

Required analytical parameters, analytical methods, and target practical quantitation limits (PQL) for the 105-N Basin sediment samples are listed in Table 2-1.

Table 2-1. Required analytical parameters, analytical methods, and target practical quantitation limits for the 105-N Basin Phase 2 sediment samples.

Analytical Parameter	Analytical Method	Target Practical Quantitation Limit
Radiological Analyses		
Gross Alpha	Gas Proportional Counting	0.05 µCi/g
Gross Beta	Gas Proportional Counting	0.1 µCi/g
Americium-241 ✓	Gamma Energy Analysis (GEA)	0.05 µCi/g
Antimony-125		0.05 µCi/g
Cobalt-60 ✓		0.05 µCi/g
Cesium-134 ✓		0.05 µCi/g
Cesium-137 ✓		0.05 µCi/g
Europium-152 ✓		0.05 µCi/g
Europium-154 ✓		0.05 µCi/g
Europium-155 ✓		0.05 µCi/g
Radium-226 ✓		0.05 µCi/g
Radium-228 (Ac-228) ✓		0.05 µCi/g
Strontium-90	Chemical Separation/Beta Proportional Counting	0.05 µCi/g
Uranium Isotopic	ICP/MS	0.1 µCi/g per isotope
Americium-241 Curium-244	Chemical Separation/Alpha Energy Analysis	0.02 µCi/g
Plutonium-238 Plutonium-239/240	Chemical Separation/Alpha Energy Analysis	0.02 µCi/g 0.02 µCi/g
Chemical Analyses		
pH	pH Electrode	0.1 pH unit
Total Metals:	SW-846/6010A (ICP)[a]	
Aluminum		20 mg/Kg
Antimony		40 mg/Kg
Arsenic		100 mg/Kg
Barium		150 mg/Kg
Beryllium		0.25 mg/Kg
Cadmium		3.5 mg/Kg
Chromium		15 mg/Kg
Iron		10 mg/Kg
Manganese		2 mg/Kg
Nickel		100 mg/Kg
Silicon		3 mg/Kg
Silver		6 mg/Kg
Sodium		60 mg/Kg
Vanadium		4.5 mg/Kg
Zinc		3 mg/Kg
Lead	or SW-846/7421 (GFAA)	7 mg/Kg
Selenium	or SW-846/7740 (GFAA)	3 mg/Kg
Thallium	or SW-846/7841 (GFAA)	1.5 mg/Kg

Analytical Parameter	Analytical Method	Target Practical Quantitation Limit
Mercury	Cold Vapor AA, SW-846/7471	0.5 mg/Kg
TCLP Metals: Antimony Arsenic Barium Beryllium Cadmium Chromium Lead Nickel Selenium Silver Thallium Vanadium	SW-846/1311 (extraction) SW-846/6010A (ICP)	 2 mg/L 5 mg/L 7 mg/L 0.01 mg/L 0.2 mg/L 0.8 mg/L 0.4 mg/L 5 mg/L 0.2 mg/L 0.3 mg/L 0.08 mg/L 0.2 mg/L
Mercury	SW-846/1311 (extraction) SW-846/7471 (CVAA)	0.02 mg/L
Polychlorinated Biphenyls (PCBs)[b]	Gas Chromatography, SW-846/8082	0.1 mg/Kg
Volatile Organics[b]	Gas Chromatography - Mass Spectrometry, SW-846/8260	0.1 mg/Kg
Semivolatile Organics[b]	Gas Chromatography - Mass Spectrometry, SW-846/8270	0.5 mg/Kg
Physical Analyses		
Particle Size	Particle Size Distribution Analyzer	0.5 to 150 µm
Particle Size	Sieve Testing (% retained on 100 mesh)	NA
Density (settled & centrifuged)	Gravimetric	NA
~~Percent Solids~~	Gravimetric	NA
~~Percent Moisture~~	~~Gravimetric~~	~~NA~~
Analyses Potentially Requested at a Later Time [c]		
Anions Bromide Chloride Fluoride Nitrate Nitrite Phosphate Sulfate	Ion Chromatography, SW-846/9056	 5 mg/Kg 5 mg/Kg 5 mg/Kg 5 mg/Kg 5 mg/Kg 5 mg/Kg 5 mg/Kg
Cyanide	Distillation/colorimetric SW-846 9010	10 mg/Kg

Analytical Parameter	Analytical Method	Target Practical Quantitation Limit
Total Organic Carbon (TOC)	Combustion, Coulemetric	200 mg/Kg
Total Inorganic Carbon (TIC)	Acidification, Coulemetric SW-846/9060 modified	50 mg/Kg
Viscosity (at 70 degrees F)	Physical Measurement	NA
Hydroxide Demand	Titration	NA
Endotherm/Exothem Assessment	Differential Scanning Calorimetry (DSC)	NA

[a]Laboratory may substitute ICP/MS for metals analysis in order to meet detection limit targets. During sample preparation for metals analysis, the laboratory must also determine and report the amount (as % of original sample weight) of actic insoluble material in the sample.

[b]If 222-S cannot provide organic analysis capabilities at time of sample receip, 222-S shall package and ship suitable aliquots for the ERC designaterd laboratory for these analyses.

[c]These analyses may be requested later. See Section 6.6.

The ERC shall have access to laboratory methods and may track all analytical procedures used in performing work under this AI. All methods used in analysis shall be approved and current. The laboratory shall notify the ERC when procedure changes or technical problems occur. These changes shall be documented in the final data reports provided to the ERC. Copies of the corresponding procedures, as well as updated versions of the procedures as revisions are made, must be available on the 222-S method file server. Analyses must meet the QC requirements of this AI and the 105-N Basin Sediment Phase 2 SAP, or failure to do so must be explained.

222-S is requested to meet the target PQLs whenever possible. Failure to meet the PQLs must be discussed in the Case Narrative in the final analytical data reports.

222-S shall perform data rechecks of previously reported results at the request of the ERC Sample and Data Management (ERC-SDM) organization. The laboratory shall respond within four business days after receipt of a written request for such rechecks. Data rechecks may consist of a review of calculations, aliquot size, yield, and other data pertinent to the reported analytical result.

222-S shall reanalyze for specific analyses at the request of the ERC-SDM. Such reanalysis may be requested to be performed on either stored or archived aliquots of the original sample or on preserved analytical preparations from the original sample, if available. 222-S shall report the results of reanalysis in writing, in accordance with requirements specified in the reanalysis request.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC objectives and quantitation limits are described in the 105-N Basin Sediment Phase 2 SAP. 222-S shall assure the integrity and validity of all analytical results through adherence to its internal QA program as outlined in the *222-S Laboratory Quality Assurance Plan*, HFN-SD-CD-QAPP-016. The laboratory shall meet the requirements of this AI and the 105-N Basin Sediment Phase 2 SAP.

In addition, the following requirements shall be met:

- The 222-S Quality Assurance Plan, QAPP-016 shall be submitted to the ERC prior to initiation of work.

- The ERC reserves the right of access to the laboratory for purposes of determining compliance to established and ERC-approved program requirements and their related implementing procedures and instructions. The laboratory is subject to ERC QA audits and surveillance at any time for the duration of this work. The ERC may stop work at any point that objective evidence is present that indicates the technical or administrative controls are less than adequate or that non-compliant quality-affecting activities exist, and shall document such concerns in writing before any work stoppage is implemented. The ERC shall be granted access to all facilities, equipment, files, and documents/records associated with this AI for QA audits and surveillance. The ERC will notify the laboratory a minimum of three calendar days in advance to arrange any audit activities.

- 222-S will follow all applicable guidelines found in the *Hanford Analytical Services Quality Assurance Requirements Documents* (HASQARD) (DOE-RL, 1996).
- The laboratory QC control data shall be available for review and shall be part of the data provided with the final deliverable data report. The laboratory's QA/QC control shall meet the requirements detailed in the 105-N Basin Sediment Phase 2 SAP.

3.1 Specific Quality Control (QC)

Specific protocol and QC requirements are outlined in the 105-N Basin Sediment Phase 2 SAP.

4.0 ANALYTICAL DELIVERABLES

222-S will report individual preliminary results as soon as available. Specific analytical delivery requests and schedules are contained in Section 7.1 Analytical Deliverables Schedule.

Transmission of analytical results by 222-S shall be made only to the ERC-SDM organization. Preliminary results shall be delivered by fax to the ERC-SDM. In no case will reports, results, or data be released to a third party without the prior written permission of the ERC-SDM.

222-S shall maintain records of data and other technical information generated in the performance of the services described in this AI.

4.1 Sample Data Reports

All final summary analytical reports and documentation MUST BE:

- Legible,
- Clearly labeled and complete in accordance with this AI,
- Arranged in an approved order,
- Paginated,
- Single-sided,
- Reproducible to the fourth generation.

Corrections to deliverables shall be made using a single line through the erroneous entry followed by the corrected entry. Corrections shall be initialed and dated by the person making the correction. If submitted documentation does not conform to the above criteria, the laboratory will be required to correct the deficiency(s) and resubmit the documentation at no additional cost to the ERC.

Records disposition requirements are specified in Section 7.4, Case File Maintenance and Records Disposition.

- COC/Shipping Documentation. Copies of all sample receipt and shipping documentation (ERC Chain of Custody, sample receipt and analysis request forms, etc.) shall be provided with the final data report.

4.2 Documentation of Analytical Methods

A listing of proposed, laboratory-approved methods shall be available on the 222-S method file server.

5.0 DOCUMENT CONTROL

222-S shall maintain controlled access storage to all records of data and other technical information generated in the performance of the services described in this AI in a safe and secured manner to prevent tampering and water or fire damage. Controlled documents include, but are not limited to:

- Logbooks,
- Chain of Custody records,
- Sample tracking records,
- Sample work sheets,
- Control charts,
- Bench sheets,
- Other documents relating to the sample or sample analysis.

All observations and results recorded by the laboratory shall be entered into permanent laboratory logbooks and/or work list templates. Guidelines in HASQARD will be followed.

All preprinted forms and logbook entries shall be signed and dated by the person responsible for the activity at the time it was performed. All logbook entries shall be in chronological order, and with the exception of run logs and extraction logs, shall include only one sample batch per page.

Instrument run logs shall be maintained to enable reconstruction of the run sequence of individual instruments. If laboratory assigned numbers are used, they must be cross-referenced to the corresponding Hanford Environmental Information System (HEIS) number.

All written entries shall be made in ink. Corrections to entries, supporting documents, and raw data shall be made by drawing a single line through the error and entering the correct information. Corrections or additions shall be initialed and dated. No information shall be obliterated or rendered unreadable.

6.0 SAMPLE MANAGEMENT

The ERC-SDM will serve as the point of contact for all communications associated with sample scheduling, shipment, receipt, analysis, and disposal. A sample is physical evidence collected from the environment or a facility. An essential part of the characterization effort is that the evidence gathered be controlled. To accomplish this, the following sample management requirements have been established.

6.1 Sample Collection and Shipment

All samples will be collected (as required by matrix and analysis requested) by the N-Basin Cleanout project personnel in conjunction with the ERC's Field Sampling organization. Sample containers will be labeled and identified as belonging to the ERC. Each label will specify a unique sample identification number, user identification, and the analysis required.

222-S shall assist the ERC in minimizing sample sizes and the number of sample containers necessary to perform the requested analyses. The laboratory shall provide information on sample size (mass or volume as applicable) sufficient for analysis in duplicate plus any QC required by the analysis protocol or method. Sample sizes provided shall be at least the laboratory's specified minimum when achievable. Notification from the ERC-SDM will be provided to the laboratory in the event that minimum sample size requirements cannot be met.

Sample delivery to 222-S will be the responsibility of the ERC. The samples will be shipped in accordance with U. S. Department of Transportation (DOT) and Department of Energy requirements. It is anticipated that samples will be shipped as DOT 7A Type A material, requiring specification packaging. The ERC will provide the containers for shipment or may make arrangements with 222-S for use of its Hedgehog sample shipment package. Samples will be evaluated for contents and dose rates after collection, and prior to shipment, to finalize shipping arrangements to 222-S.

6.2 Sample Identification and Chain of Custody

222-S shall have procedures ensuring that sample custody is maintained and documented. A sample is under custody if:

- It is in your possession, or
- It is in your view after being in your possession, or
- It was in your possession and you locked it up, or
- It is in a designated secure area, accessible only to authorized personnel.

222-S shall have a specified method for maintaining identification of samples throughout the facility. Each sample or sample preparation shall be labeled with the ERC assigned sample number (without modification) or a unique laboratory identifier. If a unique laboratory identifier is used, it shall be cross-referenced in the data deliverable to an ERC number.

6.3 Sample Receipt

222-S shall be available to receive sample shipments during regularly scheduled business hours. Arrangements for receipt of shipments during off hours will be made on a case by case basis. The laboratory shall designate a sample custodian and an alternate responsible for receiving all samples. Upon receipt of samples, the sample custodian or designated alternate shall inspect the

shipping container(s) and sample bottles and document the following information:

- Condition of shipping container,
- Custody seals (presence or absence and condition),
- Condition of sample containers,
- Presence or absence of coolant; type and condition, cooler temperature
- Custody records (presence or absence),
- Analytical request records (presence or absence),
- Sample tags/labels (presence or absence),
- Verification of agreement or non-agreement of information on shipping documents,
- Anomalies or discrepancies and their resolution.

The sample custodian or the designated alternate shall sign and date all appropriate receiving documents at the time of receipt and at the same time initiate internal Chain of Custody using documented procedures. All Chain of Custody, shipping, and sample receipt documentation shall become a permanent record as part of the Case File.

Confirmation of sample receipt and notification of any anomalies observed associated with the shipment to or receipt of samples by the laboratory shall be made to the ERC-SDM within 24 hours of receipt. The laboratory shall provide, via facsimile, copies of all Chain of Custody, shipping, and receipt documentation associated with each sample shipment to the ERC-SDM within 24 hours of receipt. The laboratory shall provide a point of contact, (i.e., NAME PHONE), during normal business hours, and a point of contact to address emergency situations during all off-shift hours.

6.4 Sample Handling and Storage

222-S shall assure the integrity and security of all samples in accordance with requirements of HASQARD.

222-S shall make every effort to assure that all aliquots removed from a sample container are representative of the sample material. The laboratory must store and preserve the integrity of the unused sample portions or preparations during all phases of processing in accordance with applicable procedures and requirements. Unused sample portions shall be maintained in accordance with storage requirements for a minimum period of sixty days after receipt of the associated data results by the ERC.

6.5 Sample Analysis

222-S shall make every effort to assure that all analytical aliquots are representative of the bulk sediment material. For a given sample, multiple containers must be recombined and homogenized. After the sample has been received and examined at 222-S, the ERC-SDM will assist the laboratory in development of any blending operations needed to address representative

aliquoting. Specific directions will be provided, as needed, on a sample-by-sample basis. All samples submitted to 222-S by the ERC shall be analyzed according to requirements specified in this AI, the 105-N Basin Sediment Phase 2 SAP, and sample-specific Analytical Requests.

6.6 Sample Disposition

Liquid material separated from the sediment shall be disposed of by 222-S through their liquid waste handling operations. Any liquid disposal must be approved through the ERC-SDM before actual disposal begins. The ERC may require analyses to be performed on the liquid material. Any liquid analyses will be under the direction of an AI issued specifically for that work.

Sediment material disposal may proceed after a minimum period of sixty days from the receipt of the associated data results by the ERC. The ERC may require additional analyses to be performed using the residual sample material. Potential additional analyses are identified in Table 2-1. If necessary, requests for these analyses will be documented using a Sample Disposition Record (SDR) issued by the ERC. Any additional analyses requested will be under the direction of an AI issued specifically for that work. If no additional analyses are requested within the sixty day archive period or no specific sample long-term archiving/disposal requests have been negotiated with the laboratory, unused sample material will be returned to the N Basin Cleanout Project at that time. Any sediment disposal must be approved through the ERC-SDM before actual disposal begins. Documentation showing disposal date shall be submitted to the ERC-SDM within 10 calendar days of sample disposal.

7.0 CONTRACT MANAGEMENT AND DELIVERABLES

The ERC-SDM will serve as the point of contact for all communications associated with this AI. Submittal of all final summary deliverables generated through the performance of this AI shall be made to the ERC-SDM. In no case will reports or analytical data be released to a third party without the prior written permission of the ERC. The 222-S project coordinator shall meet with ERC-SDM personnel on a weekly basis to review analytical progress. As part of these weekly meetings, graphical scheduling documentation shall be provided to the ERC showing the current status and projected completion dates of all operations (e.g. sample breakdown, specific analyses) associated with this project.

7.1 Analytical Deliverables Schedule

Individual preliminary results are due as soon as available. Final data package reports will be due 45 days from receipt. The following priorities/interim milestone have been established for this project:

- Sample Breakdown, analysis for GEA, Actinides, TCLP tests (on sediment and cementation test billets) and any specified Physical Properties tests must be complete with preliminary reports within 15 days.

- If any organic analysis capabilities are not available through 222-S, shipping of any subsamples to another laboratory must be complete within 15 days of receipt.

- All analytical work (with receipt of preliminary results) to be complete within 45 days of receipt.

Content requirements for data reports produced under this AI are outlined in Section 4.0, Analytical Deliverables.

7.2 Notification of Lost Samples, Reporting Error(s), Out of Control Samples or Loss of Capability

222-S shall notify the ERC-SDM via facsimile (with verbal confirmation by the laboratory of facsimile transmission) or written communication, within 24 hours, of the following abnormal events or conditions:

- Lost or inadvertently destroyed samples,
- Discrepancies or out-of-control results and supporting documentation (on samples where reruns are not feasible),
- Errors in reporting,
- The loss of a capability which may adversely affect analytical test results or the delivery of analytical test reports within the times specified herein,
- Inability to meet required turnaround times.

If required, 222-S shall provide to the ERC-SDM written confirmation of the facsimile report, with an Action Plan/Corrective Action Plan, within five business days. Whenever the laboratory determines that a correction should be made to a previously reported result, the correct result and reason for the correction shall be reported via facsimile (with verbal confirmation) and confirmed in writing within five business days. Approval of a proposed Action Plan and/or Corrective Action Plan from the laboratory shall be provided by the ERC-SDM.

7.3 Change Control

With concurrence from the N-Basin Cleanout project manager, the ERC-SDM shall provide revisions to the technical, scope, schedule, budget and funding baselines in a controlled and disciplined manner. Revisions shall be documented and provided to the laboratory in a timely manner, either through revision of this AI for scope changes, or through other formal documentation (e.g., letter detailing changes). All changes will require subsequent concurrence

by 222-S laboratory in writing. 222-S shall provide adequate change control. Sampling, scheduling, and analytical changes shall be reviewed for impact to the budget and schedule.

7.4 Case-File Maintenance and Records Disposition

222-S shall maintain a legible copy of all analytical deliverables, raw data, associated documentation and records in the case file (such that a complete package can be reconstructed if needed) until a Case File purge is requested or for a minimum period of three years after final transmittal to the ERC of the data package. Within 60 days of final summary report submittal, 222-S will provide the ERC-SDM a copy of all raw data and associated documentation and records. The laboratory records may include, but are not limited to: custody records, sample tracking records, analyst's logbook pages, bench sheets, chromatographic charts, computer printouts, raw data summaries, instrument logbook pages, and correspondence.

7.5 Analytical Procedures

222-S shall supply access to copies of all controlled procedures used under this AI.

7.6 Quality Assurance Program Plan

222-S shall each submit a controlled copy of its Quality Assurance Plan, QAPP-016 to the ERC-SDM and within 30 calendar days of any change/revision through the duration of the task.

7.7 Standard Operating Procedures

An SOP is defined as a written narrative description of facility procedures including examples of laboratory documents. The SOPs shall accurately describe the actual procedures used by the laboratory, and copies shall be available to the appropriate personnel. The laboratory must have written SOPs which cover, but are not limited to, the following areas:

- Sample receipt and log-in,
- Chain of Custody,
- Sample storage and security,
- Facility security,
- Sample tracking; receipt to disposition,
- Data reduction, verification, and reporting,
- Document control,
- Preparation and traceability of standards,
- Equipment maintenance and calibration,
- Glassware cleaning.

222-S is required to provide access to copies of all controlled SOPs that cover the referenced areas to the ERC.

8.0 REFERENCES

BHI, 1997, *105-N Basin Sediment Disposition Phase 2 Sampling and Analysis Plan*, BHI-00984, Rev.0, Bechtel Hanford, Inc., Richland, Washington.

DOE-RL, 1996, *Hanford Analytical Services Quality Assurance Requirements Documents*, DOE/RL-96-68, Vol. 1 and Vol. 4, Department of Energy, Richland Operations, Richland, Washington.

RUST, 1997, *222-S Laboratory Quality Assurance Plan*, HNF-SD-CD-QAPP-016, Rev. 2, Rust Hanford Company, Richland, Washington.

ANALYTICAL SERVICES
FY 1997 COST ESTIMATE

Customer: 105-N Phase 2 Sediment #1
Customer Code: N105_P2
Laboratory: 222-S Laboratory
Cost Estimate: $ 48,629 *
Date: 15-Dec-97

	PROCEDURE NUMBER	MATRIX	UNIT PRICE	# OF SAMPLE	Note (1) (2) NUMBER OF QC BLANKS	SPIKES	STANDARDS	DUPLICATES	TOTAL	COST ESTIMATE
SAMPLE PREPARATION:										
Digestion - Acid (Liquid) ICP/FL&GFAA	LA-505-159	Solid	496	1	1	1	1	1	4	2,480
Centrifuged Density	Test Plan	Solid	366	1	0	0	0	0	0	366
Settled Density	Test Plan	Solid	179	1	0	0	0	0	0	179
TOTAL SAMPLE PREPARATION										3,025
ANALYSES:										
Inorganic and Physical Analysis:										
ICP	LA-505-151/161	Solid	188	1	1	1	1	1	4	940
Hg	LA-325-104	Solid	377	1	1	1	1	1	4	1,885
pH	LA-212-106	Liquid	19	1	0	0	1	1	2	57
Sieve Test	Test Plan	Solid								1,775
Particle Size	LT-519-101	Solid	108	1	0	0	0	1	1	216
% Water	LA-564-101	Solid	75	1	0	0	1	1	2	225
Isotopic Uranium (ICP/MS)	LT-506-101	Solid	188	1	1	1	1	1	4	940
Total Inorganic and Physical Analysis										6,038
Organic Analyses										
PCB SW846	LA-523-434	Solid	246	1	1	1	1	1	4	1,230
VOA	LA-523-405	Solid	502	1	1	1	1	1	4	2,510
Semi-VOA	LA-523-406	Solid	906	1	1	1	1	1	4	4,530
Total Organic Analyses										8,270
Radionuclide Analyses:										
Pu238 Pu239/Pu240	LA-953-104	Solid	635	1	1	0	1	1	3	2,540
Am-241/Cm243	LA-953-104	Solid	754	1	1	0	1	1	3	3,016
GEA:Cs137/Co60/Eu154-155/Am241	LA-548-121	Solid	156	1	1	0	1	1	3	624
Total Alpha/Total Beta	LA-508-101	Solid	113	1	1	1	1	1	4	565
Sr-90	LA-220-101	Solid	310	1	1	0	1	1	3	1,240
Total Radionuclide Analyses										7,985
TOTAL ANALYSES										$22,293
DATA REPORTING:										
Full Data Package			22,102	0					0	-
Data Package			2,431	1					1	2,431
Summary Data Package			1,235	0					0	-
TOTAL DATA REPORTING										$2,431
OTHER COST:										
PCB Waste Handling										12,659
Enhanced Laboratory/Client Interface	4 hous per week x 4 weeks		$50.15							$ 803
TOTAL OTHER COST										$ 13,462
TOTAL										41,211
G&A/SWS 18.0%										7,418
TOTAL COST ESTIMATE (Note 4)										$48,629

*Program $

COMMENTS:
*Preliminary until all information has been received on work to be accomplished.
(1) QC performed on each analyte QC consist of Blanks, Standards and Spikes.
(2) Amount of QC analyzed depends on batching requirements. The estimates above may be low and be subject to change.
(4) Does not include field blanks or field duplicates.

TCLP (1)

ANALYTICAL SERVICES
FY 1997 COST ESTIMATE

Customer: 105-N Phase 2 TCLP Analyses — Samples 3, 4, 5, 6, 7 & 8
Customer Code: N105_P2
Laboratory: 222-S Laboratory
Cost Estimate: $ 21,698 *
Date: 11-Dec-97

	PROCEDURE NUMBER	MATRIX	UNIT PRICE	# OF SAMPLE	Note (1) (2) NUMBER OF QC BLANK	SPIKES	STANDARDS	DUPLICATES	TOTAL	COST ESTIMATE
SAMPLE PREPARATION:										
Acid Digestion (raw sludge)	LA-505-158	Liquid	248	1	1	1	1	1	4	1,240
TCLP Digestion/Extraction (raw sludge)	LA-544-134	Solid	509	1	1	0	1	1	3	2,036
Acid Digestion (cement billet)	LA-505-158	Liquid	248	1	1	1	1	1	4	1,240
TCLP Digestion/Extraction (cement billet)	LA-544-134	Solid	509	1	1	0	1	1	3	2,036
TOTAL SAMPLE PREPARATION										6,552
ANALYSES:										
Inorganic and Physical Analysis:										
ICP (TCLP Extract) raw sludge	LA-505-151	Liquid	188	1	1	1	1	1	4	940
Hg (TCLP Extract) raw sludge	LA-325-104	Liquid	377	1	1	1	1	1	4	1,885
ICP (TCLP Extract) cement billet	LA-505-151	Liquid	188	1	1	1	1	1	4	940
Hg (TCLP Extract) cement billet	LA-325-104	Liquid	377	1	1	1	1	1	4	1,885
Total Inorganic and Physical Analysis										5,650
Radionuclide Analyses:										
Total Radionuclide Analyses										0
TOTAL ANALYSES										$5,650
DATA REPORTING:										
Full Data Package									0	-
Data Package			2,431	0					0	-
Summary Data Package									0	-
TOTAL DATA REPORTING										$0
OTHER COST:										
PCB Waste Handling										6,101
TOTAL OTHER COST										$ 6,101
TOTAL										18,303
G&A/SWS 18.0%										3,295
TOTAL COST ESTIMATE (Note 4)										$21,598

*Program $

COMMENTS:
*Preliminary until all information has been received on work to be accomplished.
This estimate is for FY 1997. The estimate above will have to be revised to FY 1998 rates if work progresses into FY 1998.
(1) QC performed on each analyte QC consist of Blanks, Standards and Spikes.
(2) Amount of QC analyzed depends on batching requirements. The estimates above may be low and be subject to change.
(4) Does not include field blanks or field duplicates.

054333

WORK ORDER

54-30L 18 (01 89)

*SERVICING/ COST CENTER	*CUSTOMER/ SUPPORT CODE	SUB-ACCOUNT/ ACCT. CLASS	REF. NO. W/O	AUTH. FUNDS	AREA	BLDG.	(1)
PHMC			DB8224	$71,000.00			

START DATE	TERM DATE	OVERHEAD CODES	PROJECT NO.

RESPONSIBLE ORG.	QA LEVEL	QA REVIEW	FY FUNDS	PR. NO.	SYSTEM

DESCRIPTION — FACILITIES CHANGE NOTICE - ☐ YES ☐ NO

ASSIGNED TO WMH L.F. Perkins — FM. NO

Perform sediment analyses as directed in the attached Letter of Instruction (RUNBDR 2800)

Note: Do not exceed approved funding without approval from BHI

ESTIMATED COST (INCLUDES REFERRAL ORDERS)

HOURS	
LABOR & TIME	
MATERIAL	
OTHER	
TOTAL	

BUDGET APPROVAL	DATE		LINE OR COST ACCOUNT

ISSUED BY	DATE	PHONE	ACCEPTED BY	ASSIGNED SERV
S J TRENT	12/19/97	373-1482		

APPROVED BY	DATE	COMPLETED - FMN	DATE	ISSUING ORGAN
L.F. Perkins	12/19/97			

* FIRST DIGIT COMPANY INDICATOR: D - PNL R - KEH M - HEHF W - WHC 9 - DOE

(1) FOR INTERNAL CONTRACTOR USE ONLY.

☆ U.S. GPO: 1995-690-266

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-001	Page 1 of 1

Collector: Richard Mahood	Company Contact: A. D. Dada — Telephone No.: 372-9190	Project Coordinator: WEISS, RL	Data Turnaround: 45 Days
Project Designation: 105-N Basin Phase 2 Sediment Samples	Sampling Location: N-Basin	SAF No.: B98-044	
Ice Chest No.	Field Logbook No.	Method of Shipment: Hand Delivery - Government Vehicle	
Shipped To: 222-S Lab Operations	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive

Special Handling and/or Storage:

		Preservation										
		Type of Container	P									
		No. of Container(s)	1									
		Volume	1L									
SAMPLE ANALYSIS			See item (1) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
[illegible]MPC8	Other Solid	12/22/97	2300	X									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Richard O. Mahood	12/23/97 1320	D. St. John	12/23/97 1320
D. St. John	12/23/97 1606	R L Chandler	12/23/97 1606

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A {Antimony, Beryllium, Nickel

Use for characterization analysis

Matrix *
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
T - Tissue
WI - Wipe
L - Liquid
V - Vegetation
X - Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-002	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetnment Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

SAMPLE ANALYSIS

	Preservation											
	Type of Container	P										
	No. of Container(s)	1										
	Volume	1L										
	See item (1) in Special Instructions											

Sample No.	Matrix *	Sample Date	Sample Time										
MPC9	Other Solid	12/22/97	2300	X									

CHAIN OF POSSESSION

Sign/Print Names			
Relinquished By Richard O. Mahood	Date/Time	Received By D. St. John	Date/Time
Relinquished By Richard O. Mahood 12/23/97	1320	Received By David St. John 12/23/97	1320
Relinquished By D. St. John	Date/Time	Received By	Date/Time
David St. John 12/23/97	1606	R L Dowler 12/23/97	1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

Use for characterization analysis

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-011	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetnment Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

119

SAMPLE ANALYSIS

Preservation												
Type of Container	P											
No. of Container(s)	1											
Volume	1L											
See item (1) in Special Instructions.												
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**									
OMR47	~~Other Solid~~ Water	12-22-97	23:00	X								

CHAIN OF POSSESSION

Sign/Print Names		
Relinquished By Richard O. Mahood Date/Time Richard O. Mahood 12/23/97 1320	Received By D.St.John Date/Time David St John 12/23/97 1320	
Relinquished By D.St.John Date/Time David St John 12/23/97 1630	Received By Date/Time R L Chenlen 12/23/97 1630	
Relinquished By Date/Time	Received By Date/Time	
Relinquished By Date/Time	Received By Date/Time	

SPECIAL INSTRUCTIONS

(1) ~~VOA - 8260A - Complete~~; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); ICP Metals - 6010A (~~Add-on~~) (~~Lead, Selenium, Thallium~~); Mercury - 7471 - (CV); Metals by ICP (TCLP) - 1311/6010A; Metals by ICP (TCLP) Add-on - ~~1311/6010A (Antimony,~~ RSM 12-23-97

N-Basin Potable Water for PCP testing

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-012	Page 1 of 1

Collector Richard Mahood	Company Contact A. D. Dada	Telephone No. 372-9190	Project Coordinator WEISS, RL	Data Turnaround 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	Sampling Location N-Basin		SAF No. B98-044	
Ice Chest No.	Field Logbook No.		Method of Shipment Hand Delivery - Govetment Vehicle	
Shipped To 222-S Lab Operations	Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive	Preservation											
	Type of Container	P										
	No. of Container(s)	1										
Special Handling and/or Storage	Volume	1L										
120 SAMPLE ANALYSIS	See item (1) in Special Instructions.											

Sample No.	Matrix *	Sample Date	Sample Time									
0MR48	~~Water~~ Other ~~Solid~~	12-22-97	2300	X								

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
Richard O. Mahood	12/23/97 1320	D. St. John	12/23/97 1320
Relinquished By	Date/Time	Received By	Date/Time
D. St John	12/23/97 1630	P L Chamberlain	12-23-97/1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) ~~VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); ICP Metals - 6010A (Add-on) {Lead, Selenium, Thallium}; Mercury - 7471 - (CV); Metals by ICP (TCLP) - 1311/6010A; Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony,~~ Rom 12-23-97

N-Basin Potable Water for PCP testing

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-003	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetrnment Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

PCP
SAMPLE ANALYSIS

121

Preservation													
Type of Container	P												
No. of Container(s)	1												
Volume	1L												
See item (1) in Special Instructions.													
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**										
OMPD0	Other Solid	12/22/97	2306	X									

CHAIN OF POSSESSION	**Sign/Print Names**	
Relinquished By Richard O. Mahood Date/Time 12/23/97 1320	Received By D. St. John Date/Time 12/23/97 1320	
Relinquished By D. St. John Date/Time 12/23/97 1606	Received By Date/Time 12/23/97 1606	
Relinquished By Date/Time	Received By Date/Time	
Relinquished By Date/Time	Received By Date/Time	

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; ~~Semi~~-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421 - (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

Process Control Sample

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-004	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetnment Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

PCP

122

SAMPLE ANALYSIS

Preservation													
Type of Container	P												
No. of Container(s)	1												
Volume	1L												
See item (1) in Special Instructions.													
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**										
MPD1	Other Solid	12/22/97	2300	K									

CHAIN OF POSSESSION

Sign/Print Names			
Relinquished By Richard Mahood	Date/Time 12/23/97 1320	Received By D. St. John	Date/Time 12/23/97 1320
Relinquished By D. St John	Date/Time 12/23/97 1606	Received By RL Charlie	Date/Time 12-23-97 1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

PCP (Process Control) sample

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-006	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetrnment Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

123

SAMPLE ANALYSIS

	Preservation										
	Type of Container	P									
	No. of Container(s)	1									
	Volume	1L									
	See item (1) in Special Instructions										

Sample No.	Matrix *	Sample Date	Sample Time									
MPD3	Other Solid	12/22/97	2300	X								

CHAIN OF POSSESSION

	Sign/Print Names		
Relinquished By Richard O. Mahood	Date/Time 12/23/97 1320	Received By D. St. John	Date/Time 12/23/97 1320
Relinquished By D. St. John	Date/Time 12/23/97 1606	Received By	Date/Time 12-23-97 1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

Process Control Sample

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION Received By ____ Title ____ Date/Time ____

FINAL SAMPLE DISPOSITION Disposal Method ____ Disposed By ____ Date/Time ____

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-007	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetnment Vehicle
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

124

SAMPLE ANALYSIS

	Preservation	Type of Container	No. of Container(s)	Volume	See item (1) in Special Instructions.
		P	1	1L	

Sample No.	Matrix *	Sample Date	Sample Time	
MPD4	Other Solid	12/22/97	2300	X

CHAIN OF POSSESSION

Sign/Print Names		
Relinquished By: Richard O. Mahood	Date/Time: 12/23/97 1320	Received By: D. St. John / Daniel St John	Date/Time: 12/23/97 1320
Relinquished By: D. St. John / Daniel St John	Date/Time: 12/23/97 1606	Received By: R L Crandall	Date/Time: 12/23/97 1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

PCP Sample

Process control

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-008	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Govetnment Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

SAMPLE ANALYSIS

125

	Preservation											
	Type of Container	P										
	No. of Container(s)	1										
	Volume	1L										
	See item (1) in Special Instructions.											

Sample No.	Matrix *	Sample Date	Sample Time										
OMPD5	Other Solid	12/22/97	2300	X									

CHAIN OF POSSESSION

	Sign/Print Names		
Relinquished By Richard O. Mahood	Date/Time 12/23/97 1320	Received By D. St. John	Date/Time 12/23/97 1320
Relinquished By D. St. John	Date/Time 12/23/97 1606	Received By	Date/Time 12/23/97 1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

PCP Sample
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X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-044-009	Page 1 of 1

Collector Richard Mahood	**Company Contact** A. D. Dada	**Telephone No.** 372-9190	**Project Coordinator** WEISS, RL	**Data Turnaround** 45 Days
Project Designation 105-N Basin Phase 2 Sediment Samples	**Sampling Location** N-Basin		**SAF No.** B98-044	
Ice Chest No.	**Field Logbook No.**		**Method of Shipment** Hand Delivery - Government Vehicle	
Shipped To 222-S Lab Operations	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage

Preservation											
Type of Container	P										
No. of Container(s)	1										
Volume	1L										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										
126											

Sample No.	Matrix *	Sample Date	Sample Time									
0MPD6	Other Solid	12/22/97	2300	X								

CHAIN OF POSSESSION

Sign/Print Names			
Relinquished By Richard O. Mahood	Date/Time 12/23/97 1320	Received By D. St. John	Date/Time 12/23/97 1320
Relinquished By D. St. John	Date/Time 12/23/97 1606	Received By R L Mahood	Date/Time 12-23-97 1606
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) VOA - 8260A - Complete; Semi-VOA - 8270A (TCL); PCBs - 8080; ICP Metals - 6010A (SW-846); Lead - 7421- (GFAA); Selenium - 7740 - (GFAA); Thallium - 7841 - (GFAA); Mercury - 7471 - (CV); Metals by ICP (TCLP) Add-on - 1311/6010A (Antimony, Beryllium, Nickel

Process Control Sample

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V	= Vegetation
X	= Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Letter of Instruction #072197

1.0 Introduction:

Procedure LA-523-457 has not been reactivated. Because of this we will operate under this letter of instruction for the analysis of chlorinated pesticides and PCBs until the procedure is reactivated or another procedure is written.. The following messages relate to the problem.

Subject: Re[2]: Status of LA-523-457
Author: Ty R Hamlin at ~HANFORD03C
Date: 7/16/97 3:16 PM

I'm sure I sent this periodic review thru plant mail before 6-3-97. We need this method active for analysis.

Please send me whatever we need to get this thing fixed.

Ty

_____ Reply Separator _____

Subject: Re: Status of LA-523-457
Author: Kim B Wehner at ~WHC121
Date: 7/15/97 1:40 PM

Ty,

Call Margraret and have her send the forms to reactive the procedure.

Kim

2.0 Summary

The analysis is based on the United States Environmental Protection Agency (EPA) method given in the SW-846 Test Methods for Evaluating
Solid Waste, Volume 1B: Laboratory Manual Physical/Chemical Methods, September 1994, Method 8081.

3.0 Applications/Limitations

Prior to using this method, the samples should be prepared for chromatography using the appropriate sample preparation and cleanup methods.

This method is restricted to use by analysts experienced in the use of gas chromatography and with the appropriate qualifications listed in "Waste Sampling and Characterization Facility Quality Assurance Plan" HNF-SD-CP-QAPP-017.

4.0 Quality Control Protocol

See Chapter 1 QA/QC, Method 8000, and Method 8081 in the SW-846 Test Methods for Evaluating Solid Waste, Volume 1B: Laboratory Manual Physical/Chemical Methods, September 1994, Third Edition, Update II, for a complete description of the quality control requirements.

5.0 Safety

Before chemicals are used, the person handling them should be familiar with the information provided by the vendor in the MSDS. If the required MSDS is not available, contact the Analytical Services Standards Laboratory.

Personnel handling chemicals must use proper personal protective equipment to protect themselves from chemical exposure.

Refer to WHC-CM-1-10, Safety Manual; WHC-CM-1-11, Industrial Hygiene Manual; WHC-CM-4-40, Industrial Hygiene Manual; HSRCM-1, Hanford Site Radiological Control Manual; and WHC-SD-CP-HSP-001, Westinghouse Hanford Company Chemical Hygiene Plan (Sant 1995) for additional safety instructions.

Each individual is responsible for his/her own safety. Common sense must be used for safe operation.

6.0 Reagents

See SW-846 Test Methods for Evaluation Solid Waste, Volume 1B: Laboratory Manual Physical/Chemical Methods, September 1994, Third Edition. Method 8081, for the reagent requirements.

7.0 Equipment

See SW-846 Test Methods for Evaluation Solid Waste, Volume 1B: Laboratory Manual Physical/Chemical Methods, September 1994, Third Edition. Method 8081, for the equipment and supplies requirements.

8.0 Procedure Steps

See SW-846 Test Methods for Evaluation Solid Waste, Volume 1B: Laboratory Manual Physical/Chemical Methods, September 1994, Third Edition. Method 8081, for a complete set of instructions. Deviations from method shall be noted.

Approvals:

Responsible Scientist

Manager

Quality Assurance Officer